



THE MOTIF PROJECT | SEPTEMBER 2013

MOBILE LEARNING SURVEY REPORT



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Contents

About ADL	3
Executive Summary.....	4
What is Mobile Learning?	5
Project objectives.....	7
Mobile device capabilities	13
Alternative learning approaches, methods, and strategies	17
New design process or guidelines	21
Implications & next steps	24
Acknowledgements	27
References.....	27
About the Authors.....	28
Appendix	29

About ADL

The vision of the Advanced Distributed Learning (ADL) Initiative is to provide access to the highest quality learning and performance aiding that can be tailored to individual needs, and delivered cost effectively at the right time and at the right place.

The ADL Initiative was created to harness the power of learning and information technologies and to standardize and modernize education and training. Since its inception, the ADL Initiative has fostered the development, dissemination, and maintenance of guidelines, tools, methodologies, and policies for the cost-effective use of advanced distributed learning resource sharing across DoD, other Federal agencies, and the private sector. It has also supported research and documentation of the capabilities, limitations, costs, benefits, and effectiveness of advanced distributed learning. The ADL Initiative has Collaborative Laboratories (Co-Labs) in two locations: Alexandria, VA and Orlando, FL. These Co-Labs provide the opportunity to prototype and test the latest learning technologies and innovations for the development and delivery of ADL technologies. An overarching goal of ADL is to utilize technology to deliver information when, where, and for whom it is needed to enhance learning and performance. The ADL Initiative is part of the Department of Defense (DoD) Office of the Deputy Assistant Secretary of Defense (Readiness).

RESEARCH FOCUS

The Personal Assistant for Learning (PAL) is a long-term (10-15 years) focus of ADL's research and development endeavours. The goal of this research is to create a capability that anticipates learner needs, seamlessly integrates yet-to-be available information, and provides ubiquitous access to effective, personalized learning content

and track performance throughout the learning process from multiple platforms and devices. The PAL's interface attributes must enhance the user experience for every learner in an easy-to-use and effective manner. Knowledge and information must be capable of being shared across the environment and must be available anytime and anywhere. Intelligent agents embedded in the PAL must

Mobile Learning is a near-term enabler for many of the capabilities envisioned for the Personal Assistant for Learning (PAL).

and/or job performance aids that can be accessed from multiple noninvasive devices and platforms. The PAL environment will allow the learner to seamlessly access a network of capable peers and/or mentors; train in multiple environments that include virtual worlds, mobile learning, serious games, and simulation; and assess

ensure the user is known and the content provided to each user is adapted to each person's competency and profile. Research on mobile learning design and implementation is related to the PAL. While the PAL is the long-term goal of the ADL, mobile learning is a near-term enabler for many of capabilities envisioned for the PAL.



Executive Summary

Mobile learning presents new opportunities for both the design and delivery of learning. These new opportunities are enabled by the unique hardware and software capabilities of mobile devices coupled with convenient size and portability.

While mobile devices offer real affordances for improving performance in our work and daily lives, they are not being fully utilized in the design of the learning. Furthermore, mobile learning is not being accounted for in traditional Instructional Design (ID) processes or training models (Berking, Birtwhistle, & Haag, 2012). The researchers for this project believe these knowledge gaps and missed opportunities have led to the following outcomes:

- Many designers and developers converting existing eLearning courses by only resizing them to account for the smaller screen and interface differences.
- There is no consideration for optimizing the learning experience by leveraging the capabilities of the mobile device or by utilizing alternative approaches.

Mobile learning best practices have not been identified within the overall context of following a design process, ID model, or learning theory (Berkling, Birtwhistle, & Haag, 2012). Do learning content developers understand how

to design for the different motivational, contextual, pedagogical, and social aspects of the mobile platform? As a growing number of mobile innovations continue to enter the landscape, education and training professionals

The MoTIF project will explore learning and design approaches that leverage the capabilities of mobile devices.

are now interested in how to effectively design for a variety of mobile learning scenarios.

The ADL Initiative's Mobile Training Implementation Framework (MoTIF) project intends to explore learning and design

approaches that leverage the unique capabilities of the mobile platform. ADL is collaborating with the global education and training community in order to identify and define optimal design and development resources for mobile learning practitioners. The resources might include such things as strategies, materials, products, and guidelines, but will also advance the education and training community's knowledge about the characteristics of appropriate solutions and the processes involved in designing them.

The researchers for this project previously made informal observations and conducted a literature

review to identify the initial need for mobile learning design best practices within the overall context of following a process or instructional design model. However, in order to further validate and justify the development of guidelines or other types of resources, a more in-depth needs assessment was warranted to best understand the associated challenges and perspectives of the education and training community. This survey report is the first step in fulfilling the needs assessment. The survey report will reveal the MoTIF project objectives as well as highlight other relevant findings from the data collected from the 831 survey respondents from around the world.

What is Mobile Learning?

Many of the older definitions of mobile learning are either focused on the learner being mobile or narrowly focused on the device and technology being mobile.

ADL believes that both the learner and the device should be considered to provide a more flexible view of mobile learning. ADL describes mobile learning as:

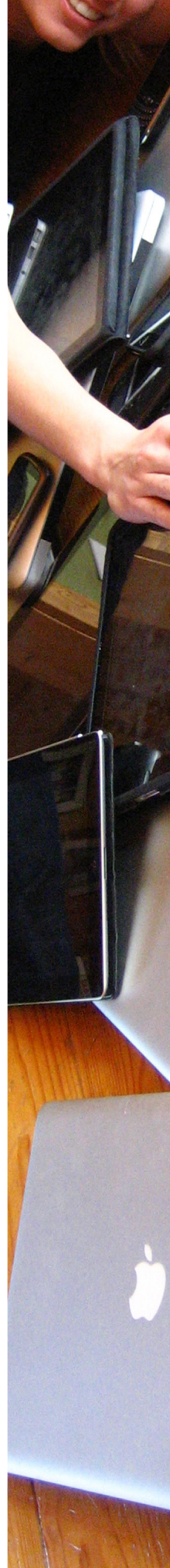
"Leveraging ubiquitous mobile technology for the adoption or augmentation of knowledge, behaviors, or skills through education, training, or performance support while the mobility of the learner may be independent of time, location, and space."

This description is broad enough to allow for a growing number of mobile learning scenarios as well as future capabilities of new technology and device types. Mobile learning should be viewed as a way to augment the learner through the use of ubiquitous technology that provides access to learning content and information, anytime and anywhere. Unlike other learning technologies, mobile learning is unique in that it can accommodate both formal and informal learning in collaborative or individual learning modes. Based on ADL's view of mobile learning it could be represented within any of the following learning scenarios:

- blended learning
- classroom augmentation

- contextual learning
- game-based learning
- just-in-time learning
- media learning
- personal learning networks
- search-based learning
- training courses
- simulation-based learning
- social media-based learning
- spaced learning

The term "eLearning" is used throughout this report. The ADL Initiative defines "distributed learning" as "Learning, mediated with technology, that is accessed through a network or experienced via portable media." In comparison to eLearning, which is often defined similarly, many in the community might say the terms are synonymous while others might argue that eLearning has a much broader scope. Making the distinctions is beyond the scope of this study. The researchers use the terms "eLearning" and "eLearning courses" to imply "distributed learning" simply because these terms are more commonly used within the broader learning community.



Which Mobile Devices Are Most Often Used for Learning?

While ADL's view of Mobile Learning is widely inclusive, the authors recognize that the focus of the project and this survey must identify the specific device types in order to be truly useful to the global ADL community. The specific device types targeted for this project and the survey are touchscreen tablets and touchscreen smartphones that allow a human finger or stylus to be used for interacting with the device. Today's mobile devices that have a touchscreen and advanced hardware capabilities offer the most potential for rich mobile learning opportunities, and are the intended focus for the MoTIF Project. In addition, smartphones and tablets are so prevalent because they are the most portable. The survey asked the respondents which mobile device they use most often for learning. The results of this question further validate the focus on smartphones and tablets, with the highest responses reported as 61% for tablets and 29% for smartphones.

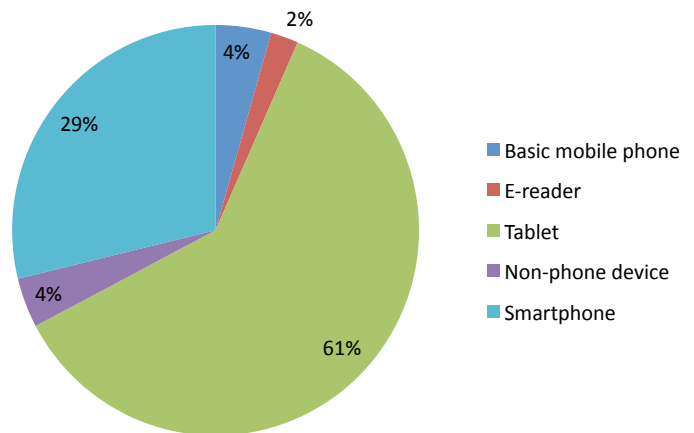


Figure 1: Mobile devices used most often for learning

61% use tablets and 29% use smartphones for mobile learning

Project objectives

MoTIF is focused on exploring alternatives and enhancements to traditional instructional and curriculum design in order to help augment learning strategy.



The MoTIF Project is specifically focused on exploring the intersection of multiple design and research methods in order to better understand—and ultimately influence—how education and training professionals can best utilize and leverage mobile-based technology to design optimal learning solutions. Although the acronym chosen for this project may seem to imply a focus on a training framework, the actual intent is for designers to also consider alternatives and enhancements to traditional curriculum and instructional design in order to help augment their learning design strategy.

THE CURRENT CONDITION

Many education and training professionals are creating new mobile content and Apps as well as converting existing eLearning courses with little or no consideration of:

- leveraging the unique capabilities of the mobile platform (e.g., camera, sensors, GPS)
- using complementary and alternative learning approaches (e.g., performance support, spaced repetition)

THE DESIRED END STATE

Education and training professionals improve learning design by leveraging the capabilities of the mobile platform and by incorporating complementary or alternative learning approaches.

NEEDS ASSESSMENT OBJECTIVES

The purpose of the survey was to collect data for further analysis as the first step in a needs assessment. The needs assessment will help to substantiate the aforementioned current condition. In addition, the needs assessment will determine whether and to what degree the target audience shares the goal of the aforementioned desired end state.

The objectives identified for the needs assessment were not merely dependent on gathering information about the target audience and their existing knowledge or skills. The objectives required a deeper investigation into the target audience's perceptions about mobile learning, mobile learning design, and their mobile device capabilities and preferences. The following objectives were used to guide the researchers:

1. Determine if there is a perceived need to identify and document the unique capabilities of the mobile platform and their use cases for learning.
2. Determine if there is a perceived need to identify alternative learning approaches that are appropriate for the mobile platform.
3. Determine if there is a perceived need for a mobile learning-optimized design workflow process or framework.

General results & demographics

PARTICIPATION BY GENDER

The participation among females was higher at 431, and the males were only 4% less at 399.

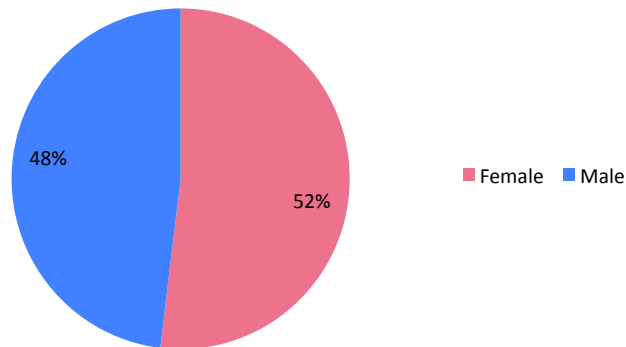


Figure 2: Participation by gender

PARTICIPATION BY AGE

The survey asked each of the respondents to provide their age range. Each of the participation age ranges was represented by at least some respondents in the survey. Eighty-seven percent of the respondents were between ages 35 and 64, indicating a potentially high level of responses from professionals experienced in education and training.

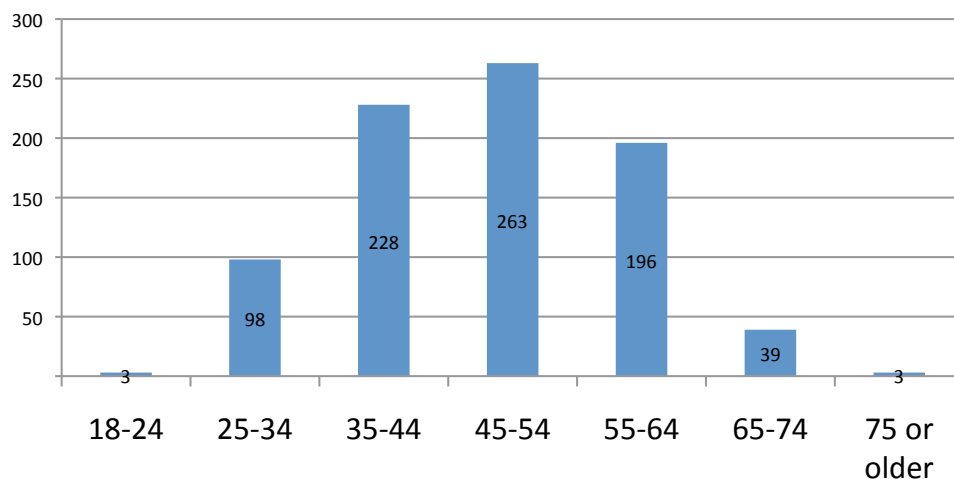


Figure 3: Participation by age

PARTICIPATION BY COUNTRY

A total of 56 countries were represented in the survey. The United States had the highest frequency of representation with 650 respondents. The researchers anticipated a higher response rate from the U.S. compared to other countries since they primarily used U.S. communication and social media channels to distribute the survey announcement. The U.S. was followed by Canada with 33 respondents, the United Kingdom with 23 respondents, India with 16 respondents, and Australia with 13 respondents.

COUNTRY	NUMBER OF RESPONDENTS	COUNTRY	NUMBER OF RESPONDENTS	COUNTRY	NUMBER OF RESPONDENTS
Argentina	1	Iceland	1	Qatar	1
Australia	13	India	16	Romania	2
Austria	2	Indonesia	1	Russian Federation	1
Belgium	3	Ireland	3	Serbia	1
Bolivia	1	Italy	7	South Africa	5
Bosnia and Herzegovina	1	Jamaica	2	Spain	5
Brazil	1	Japan	1	Sri Lanka	1
Bulgaria	1	Korea, Republic of	2	Switzerland	2
Canada	33	Lebanon	1	Tanzania, United Republic of	1
China	1	Lithuania	1	Trinidad and Tobago	1
Colombia	3	Malaysia	2	Turkey	1
Denmark	1	Mexico	5	Ukraine	1
Eritrea	1	Netherlands	5	United Arab Emirates	2
Finland	1	New Zealand	1	United Kingdom	23
France	3	Nigeria	1	United States	650
Ghana	1	Norway	3	Venezuela	1
Greece	2	Oman	1	Virgin Islands, U.S.	1
Guatemala	1	Poland	1		
Hong Kong	1	Portugal	1		
				TOTAL	831

HIGHEST LEVEL OF EDUCATION COMPLETED

The researchers asked the respondents to provide their highest level of education completed, since expertise in the areas of learning, education, educational technology, and instructional design is usually achieved through a higher education experience. Fifty-four percent (more than half) of the respondents had achieved a Master's degree (or non-U.S. equivalent). Only 2% of the respondents did not have any education beyond secondary/high school. Many of the respondents did not have a degree in a field relating to educational technology. Refer to the Appendix for a description of the degree program of study achieved by respondents.

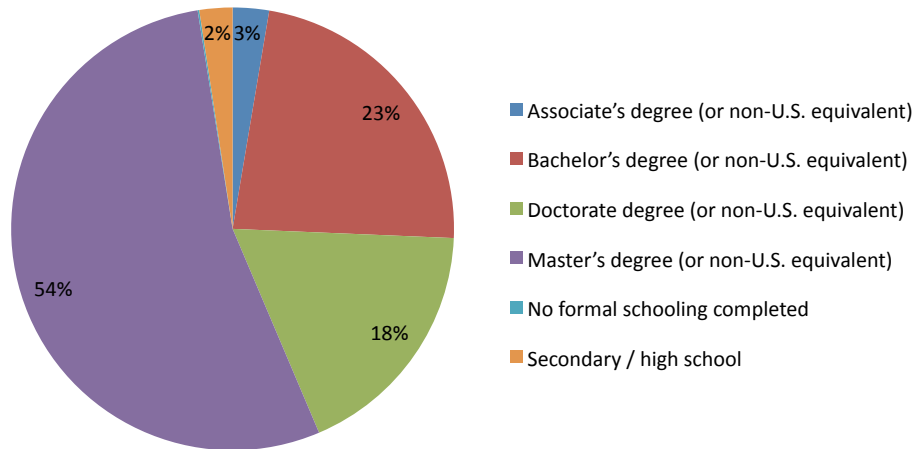


Figure 4: Highest level of education completed

ORGANIZATION TYPES REPRESENTED

Although ADL's mission is to support the DoD, the global education and training community across all industry and organization types has the potential to influence and benefit from a mobile learning framework. Therefore, the researchers distributed the survey to the largest possible audience and welcomed participation from all organization types. The commercial sector was the most represented with 246 (30%) of the responses, followed closely by Higher Ed with 229 (28%) of the responses. The U.S. Federal government was represented by 118 responses (14%), and government contractors accounted for an additional 79 (10%) of the responses.

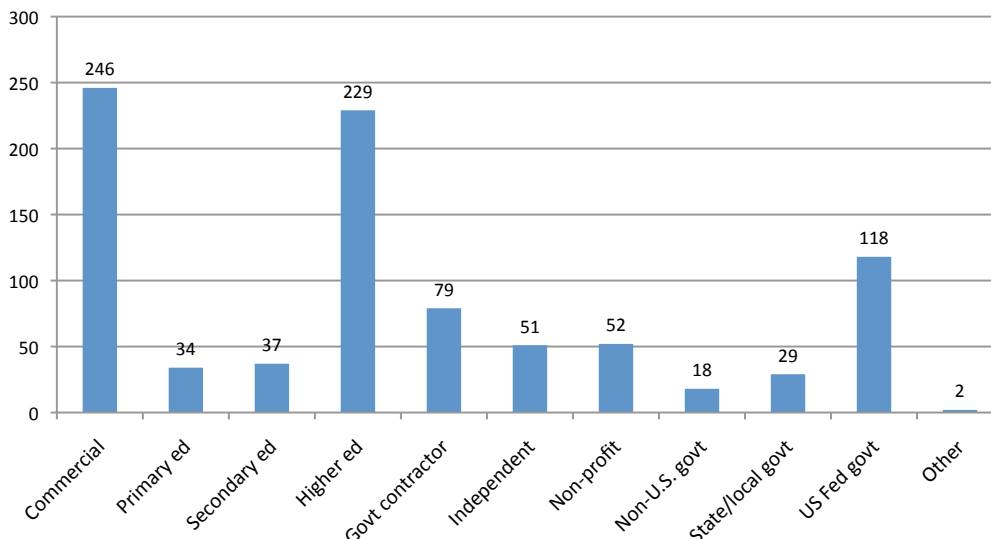


Figure 5: Organization types represented

PRIMARY ROLE OF RESPONDENTS

Survey respondents were asked to identify themselves in terms of one of the following roles and descriptions:

- **Educator:** a teacher or professor of a specialized subject in an educational setting to include both online environments and physical classrooms.
- **Human Performance Technologist:** one who is certified in Human Performance Technology (HPT) and has experience with applying the HPT model in education and training settings.
- **Instructional Designer:** one who creates planned learning experiences with the goal of the learner acquiring knowledge or skills.
- **Instructor/Trainer:** one who prepares or guides learners toward specific vocational or training objectives that satisfy job-related tasks or skills.
- **Learning Content Creator:** anyone responsible for creating media assets to support a learning experience.
- **Manager:** one who directs, controls, or manages the business operations of a team, program, or organization focused on education or training goals.
- **Researcher:** one who conducts research into theory and best practices for developing education, instruction, or training materials.
- **Student:** (education or training-related program, including interns)
- **Student:** (non-education or training program)
- **Other:**

The largest number of respondents was “Managers” at 38%, while the second largest percentage of respondents was “Instructional Designers” at 29%. Of those respondents who answered “Manager,” 17% of them had a degree in instructional design or instructional technology. Therefore, around 47% of the respondents were knowledgeable about instructional design. While the above descriptions may not be inclusive of all respondents (see Appendix for an analysis of those who answered “Other” for Question 7: “What is your primary role within your organization?”), the intent in this question was to provide a baseline for who participated in the survey.

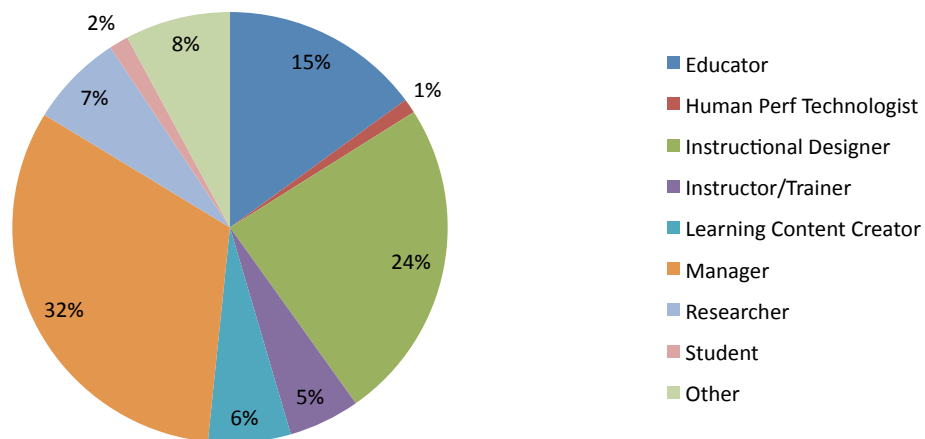


Figure 6: Primary role of respondents

YEARS OF EXPERIENCE IN LEARNING, EDUCATION, OR TRAINING

In order to evaluate the credibility of the responses of the target audience, the researchers asked how many years of experience the respondents had as a practitioner in the fields of learning, education, or training. Seventy-five percent of the respondents had at least 10 years of experience in learning, education, or training. The survey respondents were highly experienced, with 243 (29%) of the respondents having 16 to 25 years of experience, 237 (28.5%) having between 10 to 15 years of experience, and 140 (17%) having 26 or more years of experience.

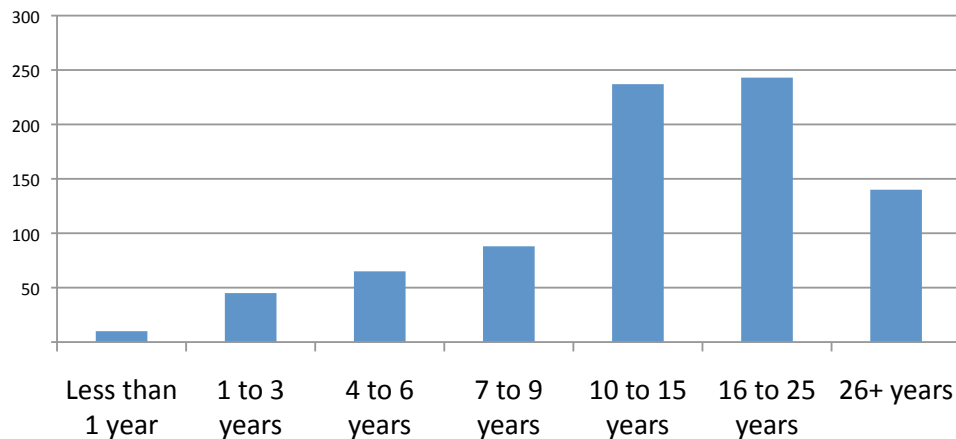


Figure 7: Years of experience in learning, education, or training

EXPERIENCE ON MOBILE PROJECTS

In addition to evaluating the years of experience in learning, education, and training the researchers also were interested in knowing how much previous experience the respondents had with working on mobile projects. Around one-third (33.9 %) of the respondents had no previous experience with working on a mobile project. Although previous experience on a mobile project was not a requirement for participating in the survey, the fact that around two-thirds (66%) of remaining the respondents had at least some experience adds even more value to the responses.

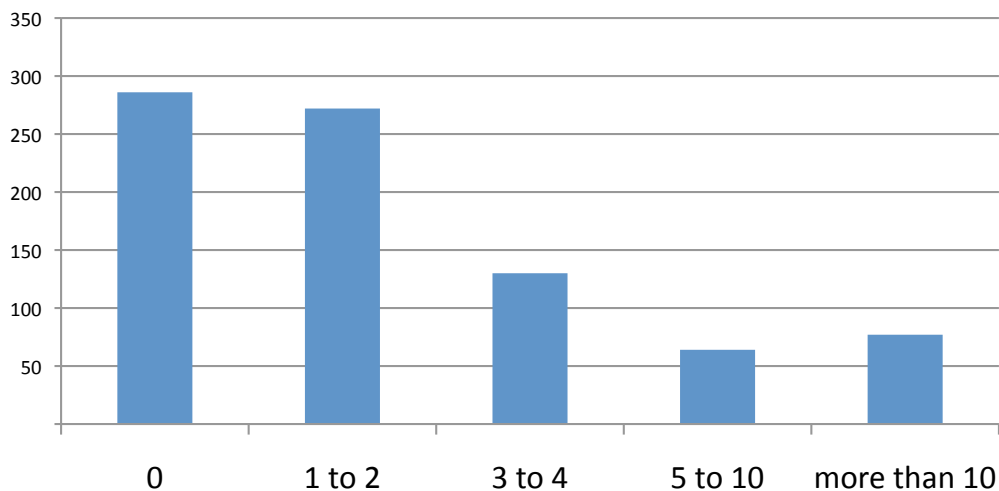


Figure 8: Experience on mobile projects

Mobile device capabilities

This section will cover all questions aligned with the first needs assessment objective: ***Determine if there is a perceived need to identify and document the unique capabilities of the mobile platform and their use cases for learning.***

For the purposes of the MoTIF project and survey, the term “capabilities” was intended to include both hardware capabilities and software capabilities. These capabilities are sometimes synonymously referred to as affordances because smartphones and tablets exhibit unique features and qualities that allow individuals to perform a specific action. Each affordance is enabled by the portability of the device with a person, coupled with a specific capability of the device. In many cases the capability is based on the combination of both hardware and software functionality. For example, the camera is a capability of many smartphones and tablets. The hardware for the camera alone does not provide a unique capability. When the camera hardware is combined with a software application (App) then such affordances as capturing video and images, augmented reality, Quick Response (QR) code reading, or content image analysis are made possible.

CAPABILITIES SEEN USED FOR LEARNING

Before the researchers can determine if there is a need to identify and document the unique capabilities of the mobile platform for learning, the respondents should reveal their understanding of and actual experience with the capabilities. The researchers asked the respondents which mobile device capabilities have they seen used for learning. The term “seen used” includes first-hand experiences on one’s own device(s), but also includes observations or demonstrations of the capabilities on other devices as well. Only 2.6% or 22 of the respondents indicated that they had not seen any of the capabilities used for learning.

Not surprisingly, the document viewer capability was the one most widely seen used for learning at 82%, followed by the media viewer capability at 79%. The capability least seen used for learning or the least selected by the respondents was the internal sensors capability at 17%. The responses to this survey question identify the use of internal sensors for learning as being the least seen, but also quite possibly as the least understood by the target audience, as some of the examples are advanced and beyond common understanding. The following were provided as contextual examples: accelerometer, barometer, compass, gyroscope, and proximity sensors. The answer choices and examples associated with this question were intended to provide more accurate responses from the respondents, and are all provided in the list of capabilities below:

- None
- Camera (capturing video and images, augmented reality, Quick Response (QR) code reading)
- Document viewer (eBook, PDF)
- Geolocation (GPS, geo-fencing, map)
- Internal sensors (accelerometer, barometer, compass, gyroscope, proximity)
- Media viewer / playback (image, video, audio, podcast)
- Microphone (voice recording, podcast)
- Notification (alert, sound, vibrate)
- Search (discovery, quick-reference, search engine)
- Short-range communication (Bluetooth, Near Field Communication (NFC), Radio Frequency Identification (RFID))
- Text message (Short Message Service (SMS), Multimedia Message Service (MMS))
- Touchscreen interaction
- Voice / phone communications
- Other (please describe)

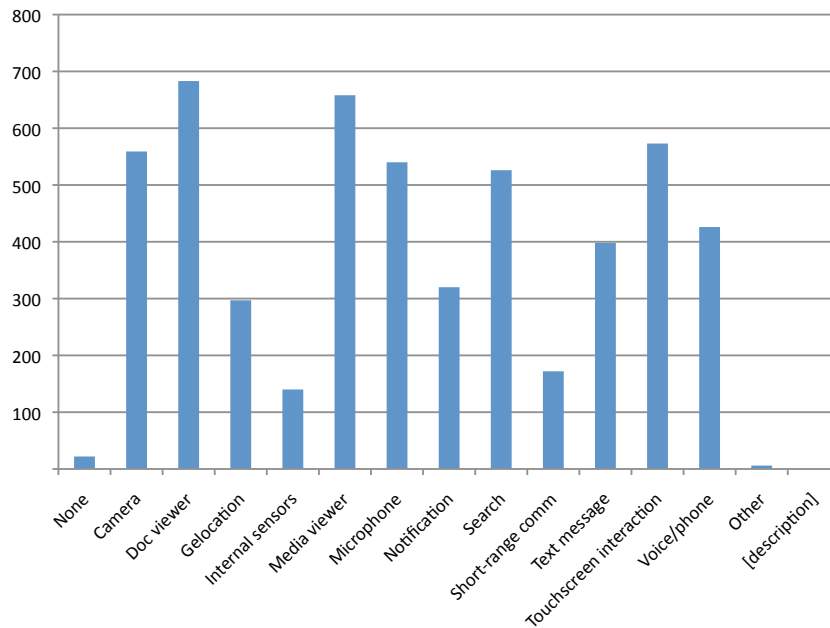


Figure 9: Mobile capabilities seen used for learning

CAPABILITIES IMPLEMENTED

The researchers asked the respondents which mobile device capabilities they have incorporated in the design or implementation of a mobile learning solution. The intent here was more than just assessing the awareness of device capabilities, but to more accurately assess their experience with designing for or implementing any of the capabilities as part of a mobile solution. Thirty-seven percent of the respondents indicated that they had not designed or implemented any of the capabilities mentioned in the question. The media and document viewer capabilities were the most widely implemented capabilities, followed by touchscreen capability. These three capabilities most likely provide the lowest barriers to entry for mobile content creators, including user-generated content. In contrast, the most complex capabilities to design and develop were represented by the lowest number of responses such as internal sensors and short-range communications.

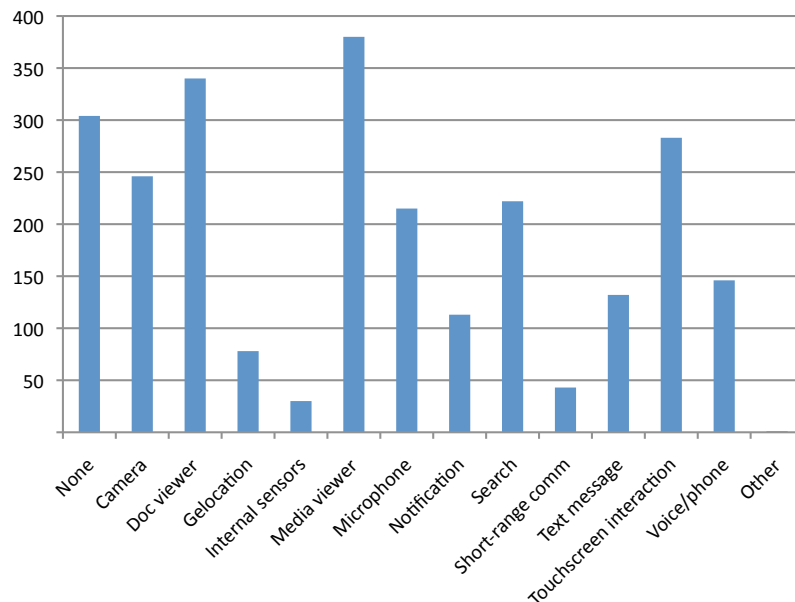


Figure 10: Capabilities implemented in a mobile learning solution

UNDERSTANDING OF MOBILE CAPABILITIES

In addition to asking the respondents which capabilities they have seen used or implemented directly, the researchers also asked which mobile device capabilities they would like to have a better understanding of in regard to their applicability for mobile learning. This question allowed for multiple responses so that the respondents could select as many multiple device capabilities as they needed. The capability that most required a better understanding was “touchscreen interaction.” This capability was also the third strongest in terms of those capabilities that had actually been implemented by the respondents. The two least selected responses were the “voice/phone” and “microphone” capabilities, respectively.

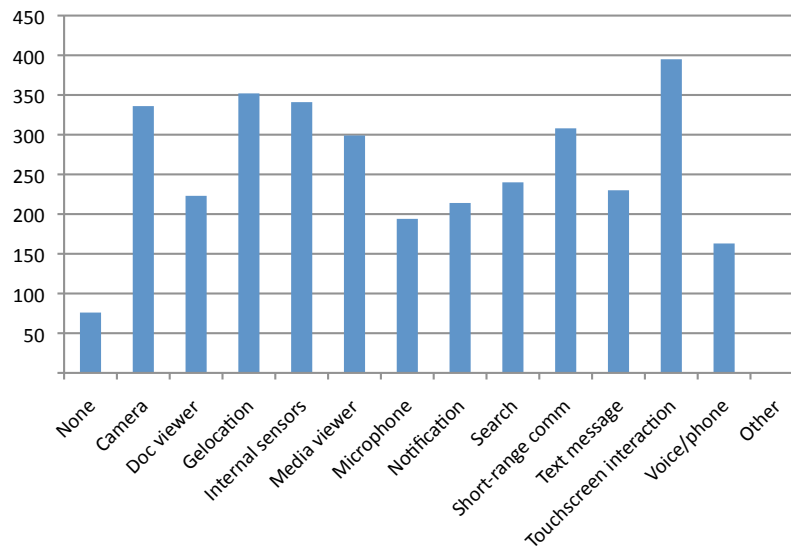


Figure 11: Desire a better understanding of mobile capabilities

UNDERSTANDING OF CAPABILITIES IN THE COMMUNITY AND ORGANIZATION

Perceptions of how the respondents viewed their organization’s understanding of mobile device capabilities did not differ much from how the respondents viewed those of the larger education and training community. In the survey, the researchers asked the respondents if there was a general understanding within the education and training community about how and when to use the capabilities of mobile devices for learning. The subsequent question then followed a similar vein, but asked if this perception existed within their organization. The researchers surmised that some respondents might feel that their organization is lagging behind the general community in terms of adoption and implementation of mobile learning. Therefore, the researchers expected that more respondents would select “organization” rather than “community.” A majority of the respondents disagreed with both of these statements (i.e., “general understanding within community” and “general understanding within organization”). However, more respondents (270) actually selected that they disagreed that there was a general understanding within the community (instead of their organization) of how and when to use the capabilities of mobile devices for learning. The next two highest responses fell under “slightly disagree” and “strongly disagree” revealing that overall the respondents generally don’t feel there is a common understanding within either the education and training community or their own organization about mobile device capabilities or when to use them for learning. The mean for both of these statements fell under “slightly disagree.”

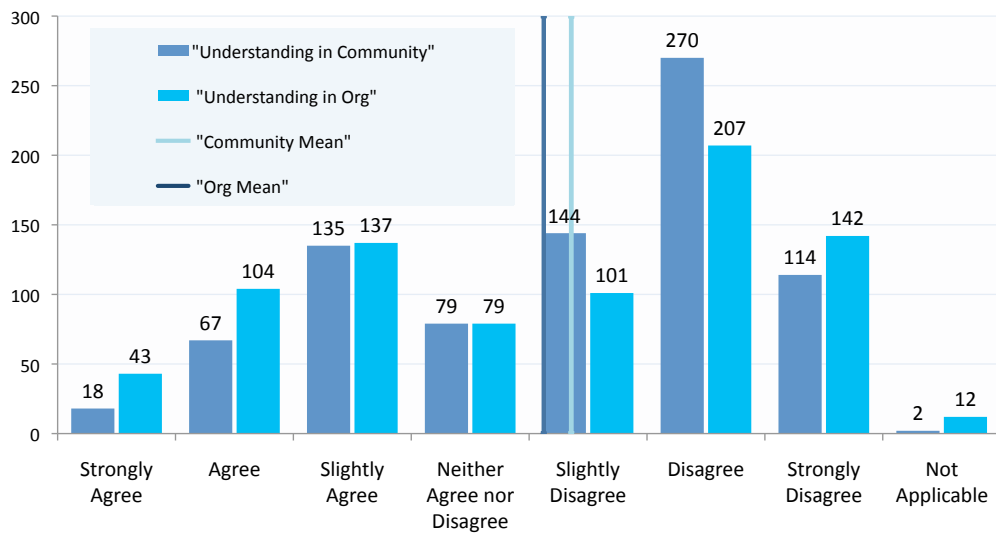


Figure 12: Understanding of capabilities in community and org

EXAMPLES CATEGORIZED BY CAPABILITIES

As the shift toward using mobile devices for learning continues, innovative Apps and interactive eBooks are becoming more prevalent. The researchers have been involved in many informal conversations in which instructional designers revealed their preference of examining existing mobile Apps during the front-end analysis phase of a mobile learning project. The researchers asked the respondents what degree they agreed or disagreed with the idea that a compilation of mobile learning examples categorized by capabilities could be helpful in designing mobile learning projects. The largest number of responses (361) and the mean for this statement fell within "agree." The second largest number of responses (285) was from respondents who strongly agreed with this statement. When combined, these top two selections accounted for 78% of the responses, indicating strong demand for education and training professionals to have access to examples when starting a mobile learning project. This preference of the target audience should be further analyzed and could lead to the development of a valuable resource for the community.

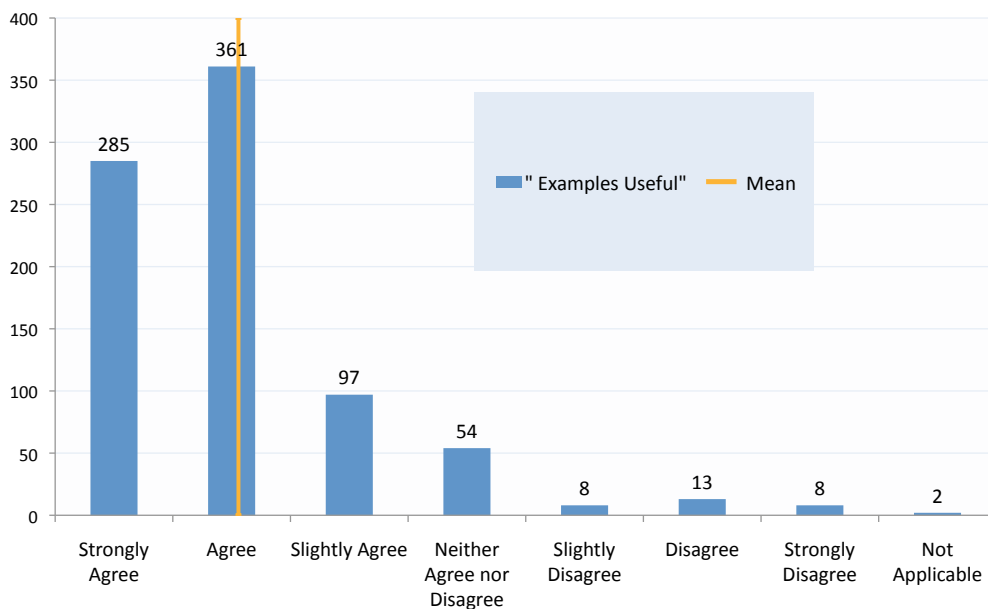


Figure 13: Examples categorized by capabilities

Alternative learning approaches, methods, and strategies

This section will cover all questions aligned with the second needs assessment objective: ***Determine if there is a perceived need to identify alternative learning approaches that are appropriate for the mobile platform.***

For the purposes of the MoTIF project and survey, the term “mobile learning” was described to include scenarios within formal, non-formal, and informal learning, as well as within mobile performance support. Although the acronym chosen for this project may seem to imply a focus on a “training framework,” the actual intent is for learning designers to also consider alternatives to training as part of their strategy. The questions aligned with this objective focused on the target audience’s perceptions about the different types of broader learning methods as well as their understanding and misconceptions of specific approaches and strategies within the community.

LEARNING STRATEGY AND INSTRUCTIONAL DESIGN

Although a common approach or occurrence in the education and training community is to convert learning materials and courses to a mobile format, the researchers sought to evaluate whether the respondents agreed with this approach without first re-evaluating the learning strategy and instructional design of the existing content. The researchers acknowledge that conversion is more likely an occurrence as a result of being directed to leverage existing learning materials, and is not always an ideal approach for a mobile learning solution. This question provided the largest response rate and degree of variance from any of the other questions in the survey. Sixty percent of the respondents selected “strongly agree” while 27% of the respondents selected “agree,” placing the mean between the two choices. Overall, the respondents favored some form of re-evaluation or analysis of existing learning materials or courses before converting them to a mobile format.

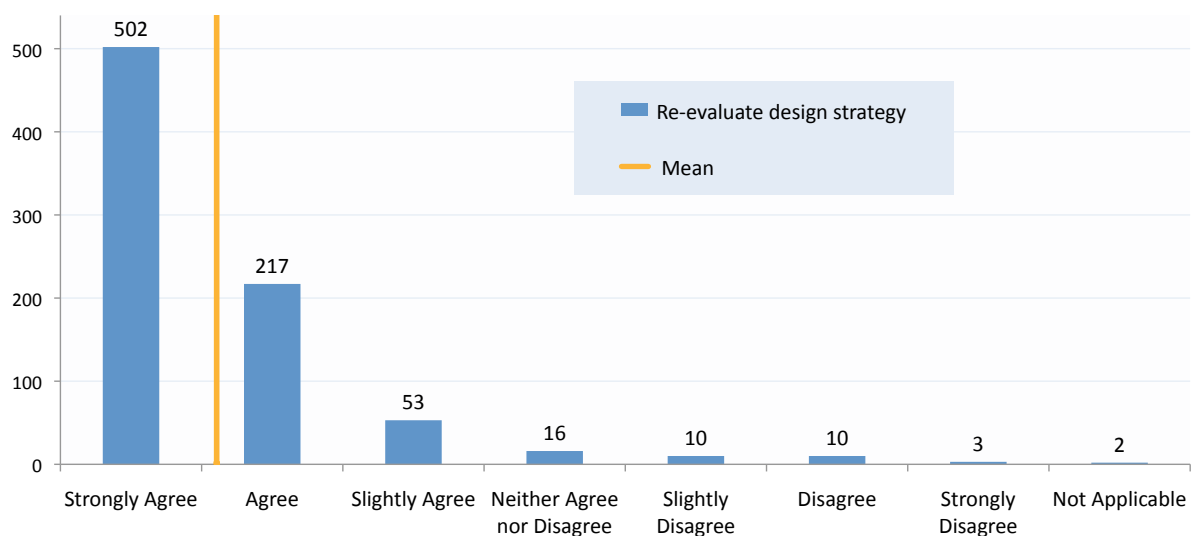


Figure 14: Re-evaluate learning strategy and instructional design

SMALL SCREEN SUFFICIENT

Although many education and training professionals are now considering the mobile platform as part of their overall learning environment, there remains a fundamental lack of understanding about the opportunities for supporting new types of learning opportunities. A common approach exhibited by learning organizations to support mobile learning is to quickly convert their existing distributed learning materials and eLearning courses originally designed for the desktop to fit on a smaller screen. Evolution from one learning paradigm to the next should not imply transference of those same design principles and practices.

The intent of this question was to see how strongly the target audience agreed or disagreed with the statement “An understanding of design for smaller screens and touch interactivity is sufficient for designing effective mobile learning.” The respondents slightly disagreed on average. The fact that the disagreement was not stronger confirms that there is a need for resources that educate designers on all of the considerations in presenting learning on mobile platform, and consideration of much more than just the variety of screen sizes and touch interactivity.

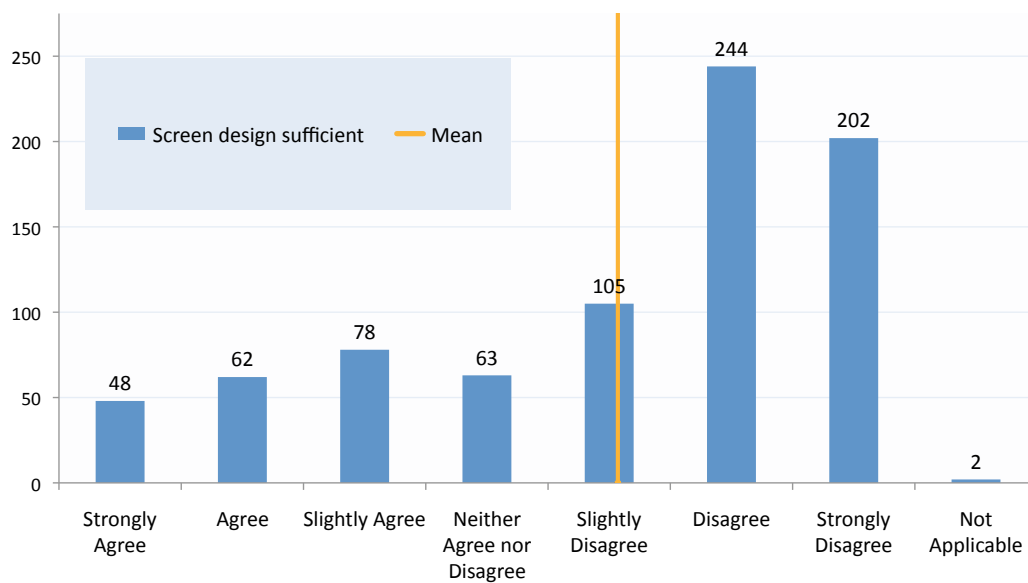


Figure 15: Small screen sufficient

METHODS WITH THE MOST PROMISE

The survey asked the respondents to rank four different methods in terms of their promise for widespread, long-term use for mobile learning. The methods are described as the following:

- Formal learning method (structured, externally-directed)
- Non-formal learning method (structured, self-directed)
- Informal learning method (unstructured, self-directed)
- Performance support method (at the point of need)

Formal learning, non-formal learning, informal learning, and performance support are terms commonly used in today's education and training technology landscape. The most important defining characteristics of formal, informal, and non-formal learning are:

1. **structured vs unstructured.** This relates to whether the learning has been prepared in advance as a planned learning experience (structured), or whether the learning experiences are selected and assembled into a learning experience by the learner (unstructured).
2. **externally-directed vs. self directed.** This relates to whether an authority figure (e.g., one's boss) prescribes the learning experience (externally-directed) or the learner decides on his or her own to engage in a learning experience.

METHODS WITH THE MOST PROMISE (CONT'D)

Formal and non-formal learning usually involves some type of assessment to verify that the learner has retained the material to be learned. For informal learning, it is up to the learners to determine that they have learned the material well enough.

The researchers recognize there is not a universally accepted definition of informal learning. It is often described as supporting multiple dimensions. The above attributes were provided to more easily help differentiate it from formal and non-formal learning.

Performance support is more commonly used in workplace learning where training alone is not the primary vehicle for learning, but is complemented, or even replaced by on-the-job information assets and aids. While the researchers recognize these types of methods might not be recognized equally by the education and training community, each of these provide a suitable high-level parent relationship and means of classification for the many types of possible mobile learning strategies discussed in "Strategies with the Most Promise." Some types of performance support materials could be considered informal in the sense that there is no assessment. It is for this reason the researchers have classified "performance support" as a method of its own.

The respondents were asked to rank each of the methods in order of importance with "1" being the highest and "4" being the lowest. The respondents reached the most agreement (409) of all of the four types by ranking formal learning as being lowest method in terms of importance. Performance support was ranked the highest of all methods by the respondents (273).

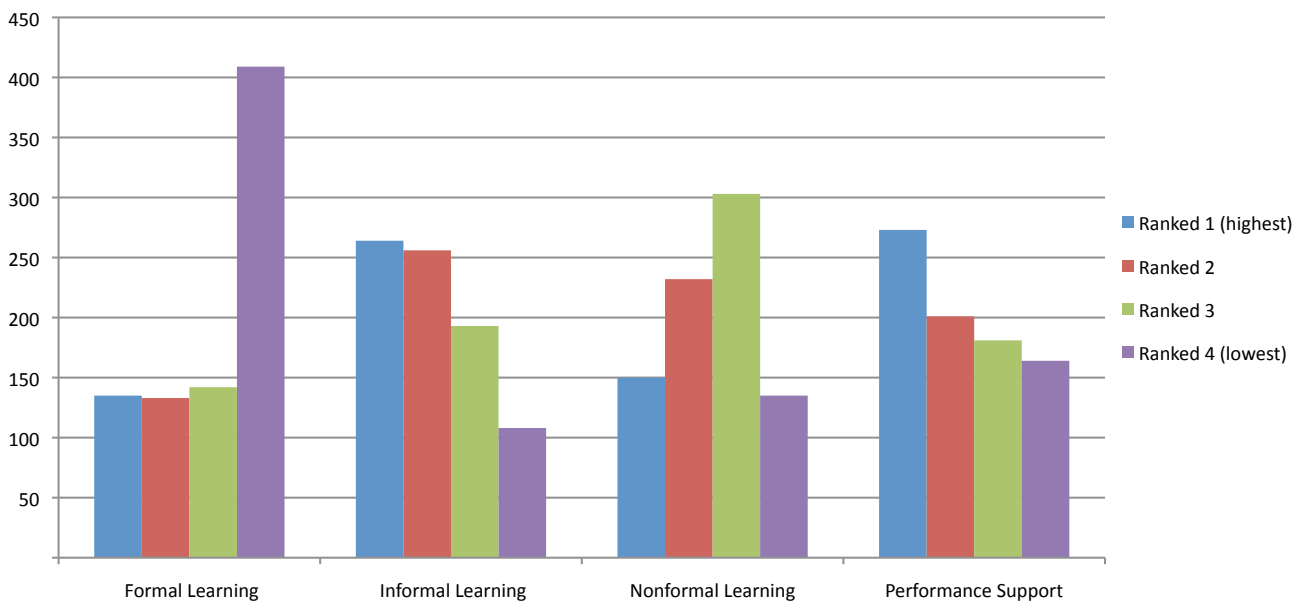


Figure 16: Methods with most promise

STRATEGIES WITH THE MOST PROMISE

As stated previously in “Methods with the Most Promise,” the many types of mobile learning strategies provided in this question could be grouped under one or more of the parent methods. For example, blended learning, classroom augmentation, and self-paced courses could be used during and grouped under the “formal learning” method. However, self-paced courses could also be part of a non-formal or informal curriculum established by the learner and grouped under those methods as well. For the sake of brevity and respect for the participant’s availability, the researchers did not articulate this relationship between “methods” and “strategies” to the respondents. In addition, allowing the respondents to answer the questions without an imposed perspective or influence from the researchers would be important in evaluating the results. The complete list of strategies is provided below:

- Blended learning (i.e., traditional instructor-led learning combined with eLearning)
- Classroom augmentation (e.g. polling applications, supplemental media used in or outside the classroom)
- Contextual learning (e.g. augmented reality, location-based (GPS), interactive response codes)
- Game-based learning
- Just-in-time learning (e.g. quick reference, job aids, checklists)
- Media push (e.g. video, audio, podcast)
- Personal learning networks
- Search-based learning
- Self-paced courses
- Simulation-based learning
- Social media-based learning
- Spaced learning (i.e., spaced repetition for improving retention)
- Other (describe)

This question was intended to measure the respondents perspectives about the potential for using specific micro-strategies for mobile learning. The respondents were asked to select up to three learning strategies that hold the most promise for widespread, long-term use for mobile learning. Only two of the selections are worthy of recognition because of their discrete difference in numerical significance from the other choices. The third highest selection was classroom augmentation (234), but it was not significantly higher than contextual learning (227) or game-based learning (205) strategies.

In this type of multiple select questions, it is important to recognize the results that yield the most value. In this case, just-in-time learning (490) and blended learning (436) revealed a noticeable amount of agreement among the respondents. Blended learning was further clarified as “traditional instructor-led learning combined with eLearning,” and should be recognized as a valuable choice for strategy. However, the examples provided for the highest selected choice, just-in-time learning, were “quick reference, job aids, and checklists.” These are types of performance support and could be grouped under the “performance support method.” The researchers feel it is worthwhile to point out that performance support method was highest in the previous rank-order question addressing “Methods with the Most Promise” (see Figure 16) and that the “Strategy with the Most Promise” most closely aligned with performance support – just-in-time learning – was also the most selected strategy option by the respondents.

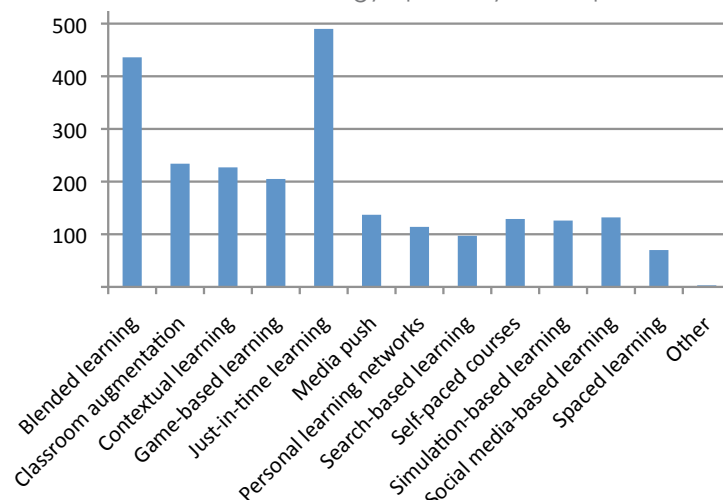


Figure 17: Strategies with most promise

New design process or guidelines

This section will cover questions aligned with the third needs assessment objective: **Determine if there is a perceived need for an optimized design workflow process or guidelines for mobile learning.**

Mobile learning best practices have not been identified within the overall context of following a design process, ID model or learning theory (Berking, Birtwhistle, & Haag, 2012). Education and training professionals making the transition from eLearning to mLearning are especially interested in how to leverage their existing knowledge and skills to design for a variety of mobile learning scenarios (Berking, Birtwhistle, & Haag, 2012). The survey questions aligned with this objective are intended to help determine if there are existing processes or models for mobile learning, and whether any have been successfully implemented. The researchers are not attempting to imply a need for sweeping changes to established instructional design (ID) processes or models. This objective is intended to reveal whether there is a need for a new process or model that steers designers towards consideration of the motivational, contextual, pedagogical, and social aspects of the mobile platform, or whether existing processes or models should be further evaluated and enhanced with mobile-specific considerations.

BEST PRACTICES AND GUIDELINES FOR MOBILE LEARNING DESIGN

The researchers previously determined that mobile learning best practices within the context of following a design process, ID model, or learning theory have not been identified. What about general best practices or guidelines for the design of mobile learning solutions (e.g., screen design, touch interactivity, engagement, learner habits, etc.)? The researchers asked the respondents if they agreed that there is a general lack of best practices and guidelines for mobile learning. One of the possible interventions associated with MoTIF project might be a set of design guidelines by identifying and documenting best practices from successful implementations. Many of the best practices and guidelines that are available today are usually generic statements about mobile development, but don't often provide much depth or detail about learning design. Some have even been adopted from traditional eLearning course design and development authoring tools and practices.

While 269 of the respondents selected "strongly agree," a majority of the respondents (331) selected "agree" as there being a general lack of best practices and guidelines for mobile learning. When "slightly agree" is combined with the other positive responses, 87% of the respondents are in some degree of agreement with this statement.

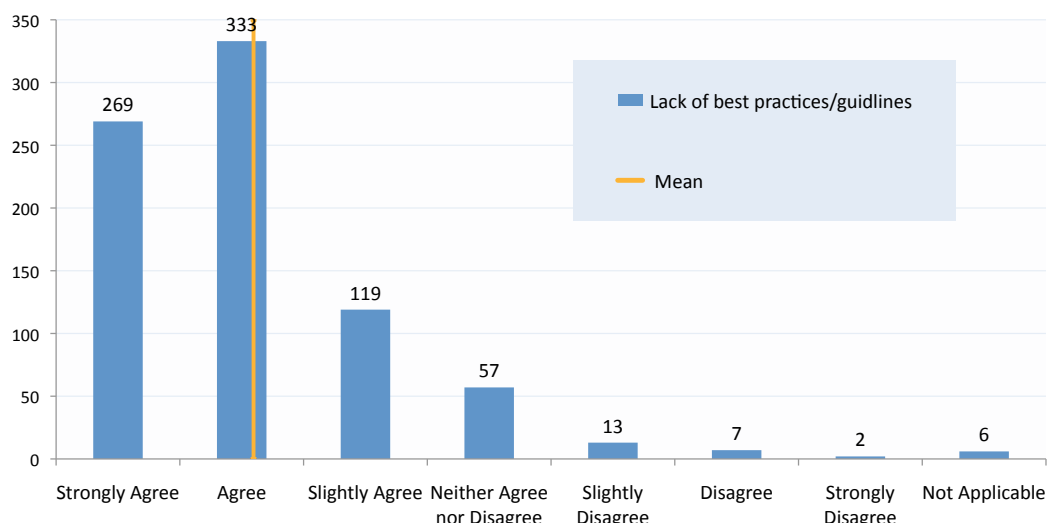


Figure 18: Lack of best practices for mobile learning

INSTRUCTIONAL DESIGN FOR MOBILE LEARNING VS. ELEARNING

Since the widespread adoption of smartphones and tablets in the U.S., many professionals in the education and training community have viewed mobile learning as simply being eLearning courses on a mobile device. Moreover, the various instructional design techniques and steps employed by eLearning developers were applied by default.

However, there are mobile-specific considerations pertaining to the attributes of the device that may have implications for the design of the learning experience. For example, smartphones and tablets have a wide range of screen space (3 to 10 inches) that would result in different approaches to layout. Features such as touchscreen interactivity and push notifications provide new opportunities for learner engagement while distractions such as screen glare may present challenges for design in situations where the device might be exposed to sunlight. In addition, supporting a variety of device types might require more frequent iterations than traditional eLearning course design. Mobile learning introduces new opportunities and concepts that differ significantly from self-paced course design.

Without going into this detail or providing these examples in the survey, the researchers generally asked the respondents if the instructional design process for mobile learning should be any different from the instructional design process for traditional eLearning. While the largest number of responses (228) selected “agree,” the mean fell under “slightly agree.”

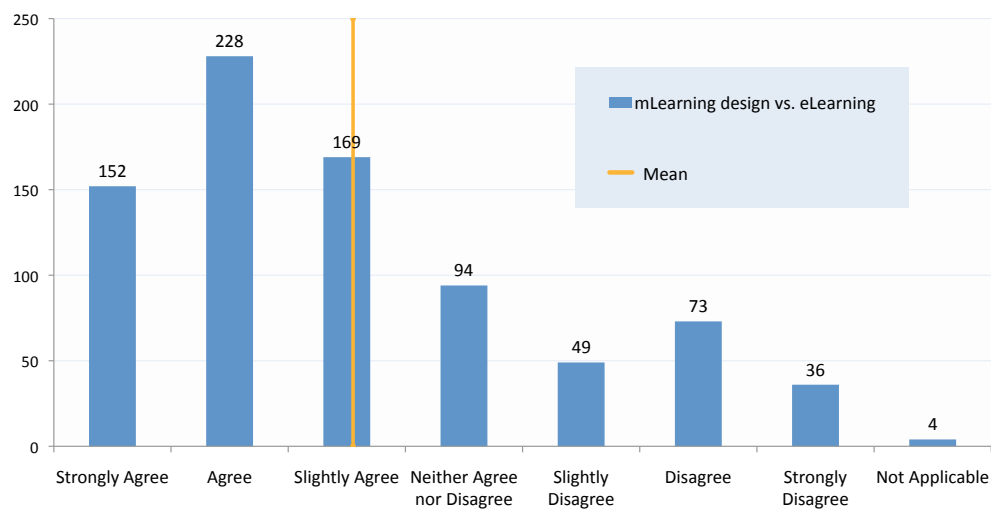


Figure 19: Instructional design for mLearning different from eLearning

DESIGN PROCESS MODEL AWARENESS

The researchers asked the respondents if there was a particular design process or model that they were aware of (but have not applied) for creating effective mobile learning. Around 90% of the respondents either were unsure or did not think there was an existing process or model. Only 84 (10%) of the respondents selected “yes” as their answer. If the respondent selected “yes,” they were asked to describe the process or model in a text field. The answers varied widely and not all of them provided a known process or model. Some of the respondents even provided the names of book authors. The researchers will conduct interviews with some of the respondents for further details from those who answered “yes” to this question and provided a legitimate process or model. Please see the Appendix for a listing of the text field responses from the participants.

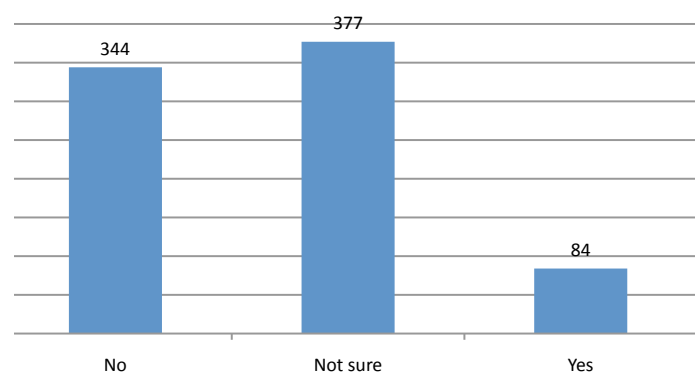


Figure 20: Awareness of mLearning process or model

DESIGN PROCESS MODEL APPLIED

In contrast to gauging the respondents' awareness of existing models or process, they were also asked about their experience with actually applying existing processes or models to a mobile learning project. If the respondent selected "yes," they were also asked to describe the process or model in a text field. A majority of the participants (632) selected "no" as not having previously applied a particular process or model to a mobile learning project while 20% of the respondents answered "yes." The researchers plan to interview some of the respondents for further details from those who answered "yes" to this question. Please see the Appendix for a listing of the text field responses from the participants.

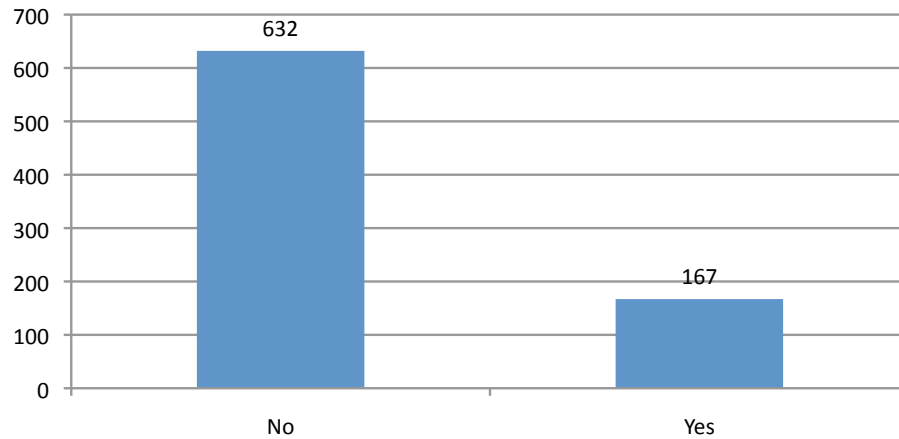


Figure 21: Experience applying a process or model for mLearning

POTENTIAL FOR NEW PROCESS MODEL TO IMPROVE ABILITY

During past informal conversations and at conferences and industry events, the researchers have observed that many education and training professionals have mixed opinions as to whether a new process or model is needed. The researchers hoped to explore this in more detail by asking a question that would provide way to more formally measure these varying perspectives. The researchers also added the topic of a "new process or model" as an objective area for the survey in order to ascertain whether the respondents would identify this as a potential need. In the survey, the researchers asked the respondents if a new workflow design process / model optimized for mobile learning could improve their ability to contribute to education and training projects. While a majority of the respondents (318) selected "agree," the mean fell between "agree" and "slightly agree." This finding will be valuable for the project's needs assessment. While some of the education and training community feel that a new process/model could improve their abilities, there will most likely be an equally large number of people that will always feel restricted or limited by following a new process or model.

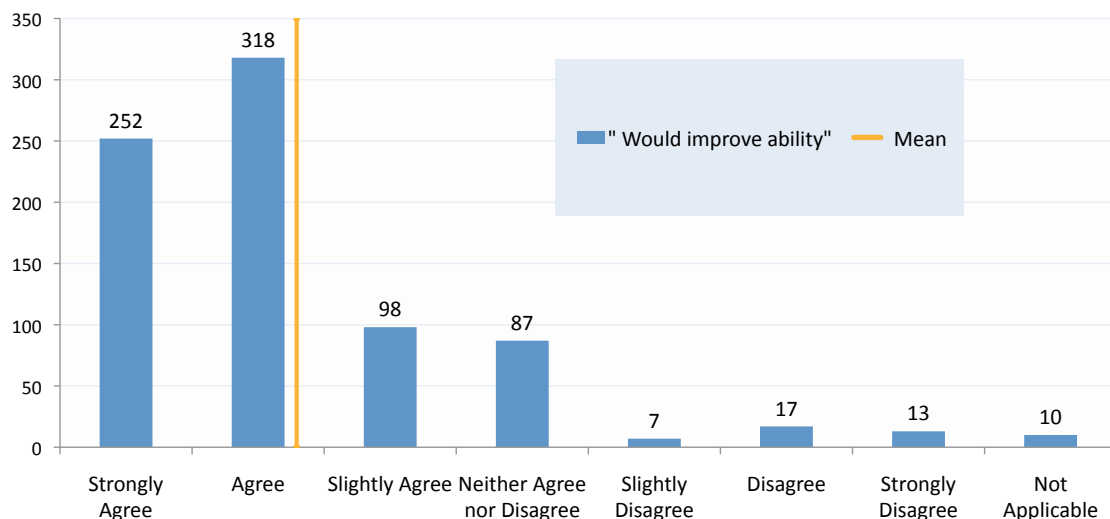


Figure 22: Potential to improve ability

Implications & next steps

Smartphone vs. Tablet

While this project is initially focused on both tablets and smartphones, further data collection and additional surveys may be required at later points in the project to further validate whether it will continue to be practical to focus on both. There are an increasing number of design implications as well as hardware expansion capability differences between smartphones and tablets as the market continues to evolve. It may not be possible to address all of the attributes of both tablets and smartphones without encountering a substantial amount of distinct differences that may require exponentially complex considerations for each device type and form factor.

As reported in the “Which Mobile Devices are Most Ubiquitous?” section, 61% of the respondents reported that they use tablets most often for mobile learning, as opposed to 29% for smartphones. Most likely, this is due to the fact that tablets simply have bigger screens, but there may be many other factors that are less obvious. The researchers intend to later investigate the design decision process for targeting tablets vs. smartphones (or both) for a mobile learning solution. However, as stated above, separate research tracks to uncover design considerations for each class and subclass of device may not be practical.

Understanding of Mobile Device Capabilities

Overall, the respondents “slightly disagreed” that there was a general understanding within the education and training community as well as their organization about how and when to use the capabilities of the mobile device for learning. Despite this lack of understanding, the fact that the mobile platform is a relatively new, complex learning technology coupled with this result points to some degree of success of information dissemination, outreach, and support efforts keeping up with this technology; otherwise, the lack of understanding would logically be greater. This result also validates the need for designers to alleviate this lack of understanding, although the need is not as urgent as it might be if respondents gave a “strong disagreement” response.

Touchscreen Capability

Touchscreen interaction was the capability most selected for requiring a better understanding of in regards to applicability for mobile learning. This surprising result might provide a good additional research area for the MoTIF project; in the experience of the researchers, touch interactivity and the psychology behind the sense of touch and the role it plays with learning and cognition has not been fully investigated in mobile learning research.

Performance Support

Performance support ranked high in terms of its promise both as a low-level learning strategy (as “just-in-time learning”) as well as a high-level learning method (as “performance support”). Two questions in the survey addressing the use of performance support revealed a high level of confidence in performance support as an optimal approach for mobile learning.

There are obvious reasons for this, in terms of the “always with you” and “always on” characteristics of mobile devices, but there may be other less obvious reasons (e.g., actions associated with procedural repetition) that the researchers hope to uncover in further research phases. These reasons would be factored into any design decision support products that are developed, which might steer instructional designers towards using performance support instead of only training as a solution to a given performance problem.

According to Rossett and Schafer (2007) there are three high-level categories of performance support: 1. Planner; 2. Sidekick; and 3. Quickcheck. The researchers intend to reach a more fine-grained analysis of performance support suitability and optimal mobile design considerations, using these three categories as a starting point.

Definition of Complex Concepts in a Survey

There is always a danger, in any survey, of respondents responding on the basis of misunderstanding of terms and concepts, thus skewing results. This is especially true of an international survey, with the English language being a potential source of confusion. This presents a challenge to the survey designers to, on the one hand, keep the survey short and refrain from over-qualifying concepts and defining terms, and, on the other hand, explaining clearly what the concepts mean.

This balance was especially difficult for the researchers in this survey, because of the complex nature of the concepts discussed, and the fact that they were new to a fair number of respondents. However, the researchers did not see direct evidence of confusion outside of Question 24, where 3% of respondents entered some variation of “can’t respond due to not understanding the subject matter” in their freeform text answers – see Appendix. The researchers tried to use industry-accepted, established, and concise terms as much as possible, but underneath the surface of their answers, it is sometimes hard to know how those terms are being interpreted. In future phases of the project, the researchers will attempt to clarify the terminology and concepts that may be unfamiliar.

Other than freeform text answers where respondents voiced confusion, we have no evidence that survey results were skewed due to not understanding terms (and in the case of Question 24, respondents who were confused simply refrained from selecting a predefined answer option). However, Questions 18, 19, 24, and 25 did use the most abstract and conceptual terms, and were therefore most subject to possible misinterpretation.

Addressing Alternative Learning Approaches

The researchers feel that the questions related to alternative learning approaches (18, 19, 24, 25) did not provide enough answers or data to fully address the second needs assessment objective #2: “Determine if there is a perceived need to identify alternative learning approaches that are appropriate for the mobile platform.”

The results for Questions 24 and 25 are not actually included in this report, since we determined after the fact that these questions were too ambiguous and redundant with questions 18 and 19. Question 24 was “For which of the following performance support approaches is there a lack of understanding of how and when to include them in a mobile learning project?” and Question 25 was “For which of the following informal learning scenarios is there a lack of understanding of how and when to include them in a mobile learning project?” The researchers retained Question 18 and 19 to provide a sense of the responses, though, again, we do not feel that the results warrant an affirmative answer to our research objective.

The problem is mostly in fully understanding terms such as “performance support,” “spaced repetition,” or “informal learning” (used as an answer choice in Question 18). In order to come to any conclusions about which alternative learning approaches need to be supported, in what ways, and how much, there needs to be a shared understanding on exactly what these terms mean. The survey results have provided a solid foundation, but qualitative data collection is warranted in this area. The obvious follow-on investigation activities for these questions would focus on asking the user, for Questions 18 and 19, “Why do you think [this learning method/strategy holds the most promise]?” For example, Question 18 is “How important are the following methods of learning in terms of their promise for widespread, long-term use for mobile learning?” Why a respondent thought that a given method of learning is important would be key to designing interventions using that approach. Likewise, for Questions 24 and 25, “For which of the following performance support approaches/informal learning scenarios is there a lack of understanding of how and when to include them in a mobile learning project?” a follow on research question would be, “What information specifically is lacking in people’s understanding?”

Catalog of Mobile Learning Examples

The researchers hypothesized that a catalog of mobile learning examples, searchable in terms of mobile device capabilities, would be a value-added resource to address the lack of understanding of mobile device capabilities. The survey revealed overwhelmingly that a catalog of examples categorized by capabilities would be helpful. It is premature to express the requirements and architecture of this catalog at this point, but the researchers feel that not only mobile device capabilities but learning approaches and other attributes could be part of the classification scheme of these examples, with indications of the types of learning objectives that might be best served by certain capabilities.

MoTIF Project Durability

As with any new learning technology, the pace of change is accelerating; mobile learning is no different. The researchers wish to acknowledge this fact by keeping the MoTIF project results from becoming outdated too quickly. The researchers' concern is to ensure relevancy in the future for our current efforts. This is especially an issue in the case of mobile device capabilities. The MoTIF project needs to adapt to new and changing capabilities. It should support grounded theoretical positions, linked to useful information and support tools that have some measure of durability, or at least are designed to incorporate extensibility and even planned obsolescence.

Acknowledgements

The ADL Mobile Learning Research Team collectively designed the survey instrument, provided statistical analysis, and authored this report. The ADL Mobile Learning Research team included the following ADL employees: Peter Berking (contractor with Serco, Inc.), Marcus Birtwhistle (contractor with Katmai Support Services), Dr. Shane Gallagher (contractor with Serco, Inc.), Jason Haag (contractor with The Tolliver Group, Inc.), Shenan Prestwich (contractor with Katmai Support Services), and Heather Walls (contractor with Serco, Inc.).

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Peter Berking has more than 17 years of experience in a broad base of instructional design and development activities, for products ranging from technology-driven e-learning products and performance support systems to instructor-led courses. He is a subject matter expert in instructional design and advanced learning technologies, publishing articles for industry publications and presenting at conferences. Peter has been an Instructional Designer at the ADL Co-Lab in Alexandria, VA since 2008. He has supported ADL through papers, articles, consultations, workshops, presentations, course design, and prototypes. Formerly a K-12 educator, he is embedded on staff at ADL through Serco, Inc. in Rockville, MD, and has been Principal Instructional Designer at Serco since 1995. He has an M.A. in Instructional Research and Curriculum Development from U.C. Berkeley and a Professional Certificate in Instructional Design from Marymount University.



Marcus Birtwhistle Research Analyst, Mobile Team

Marcus Birtwhistle joined the Advanced Distributed Learning Initiative's Mobile Learning team as mobile technologies and systems consultant in 2012. His prior experience includes developing solutions for integrating people, processes, and technologies as Certified Knowledge Manager in support of the TRADOC / CASCOM Knowledge Management Office. He has an interest in strategic alignment of systems that enable people to leverage mobile technologies for superior outcomes through distributed learning and working. He has worked on improving the Army Force Generation cycle by leveraging operational experiences and knowledge gained on deployment, and improving intelligence sharing by integrating tools with processes. His background in international relations and organizations from The College of William and Mary informs both his understanding for the power of technology and mobile learning to transform learning, working, training, and education. He is a Systems Engineering and Technical Advisor (SETA) in support of the ADL Initiative.



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Dr. Shane Gallagher received his PhD in Instructional Technology from George Mason University and MA in Educational Technology from the University of New Mexico. He has led research and evaluation projects in game based learning and cognition, learning object content models, simulations, reusable pedagogical models, organizational readiness, and knowledge management. Shane has designed enterprise learning and knowledge architectures, learning and object content models, online and blended learning and knowledge environments for the Department of Defense Directorate for Joint Forces Development (J7), Office of the Secretary of Defense (OSD), the Department of the Air Force, and the Department of the Navy (DON). He has been recognized by NASA's Johnson Space Center for his work on assessing the Center on knowledge management readiness (10,000 personnel) by the JSC Chief Knowledge Officer and has accrued customer recognition and awards for thought leadership, innovation, and instructional design as well as an understanding of the government acquisition processes and budgeting cycles through his work with the DON.



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Jason Haag's interest and background is in learning systems, web technology, and standards. He spent eight years supporting the U.S. Navy's eLearning program in both engineering and management roles before joining the Advanced Distributed Learning (ADL) Initiative. He is currently employed by The Tolliver Group, Inc. and provides Systems Engineering and Technical Assistance (SETA) support for the ADL, sponsored by the Office of the Deputy Assistant Secretary of Defense (Readiness). He took on the duties of ADL's Mobile Learning Lead in 2012 and is part of the ADL Technical Team. His primary interest is mobile learning (mLearning) research, including instructional design and performance support, mobile device platforms & technology, interface design for learning, and best practices for implementation. Jason's professional affiliations include the following: the IEEE Education Society, the American Society for Training and Development (ASTD), the eLearning Guild, the International Society for Technology in Education (ISTE), and the International Association for Mobile Learning (IAMLEARN).

Appendix

1. Methodology

Needs assessment methodologies typically follow a design beginning with the identification of the assessment objectives which is described in the section on Project Objectives (page 7). The needs assessment objectives were then used to guide the selection of the sample population, sampling strategy, data collection methods, instrument design, and analysis procedures. Based upon this guidance, the needs assessment methodology used a mixed methods design primarily relying on quantitative methods. Instrument design took the form of a survey using a questionnaire to gather data.

2. The Target Audience and Sampling Procedures

The target audience includes education and training professionals with a potential interest in implementing mobile learning. Although ADL's mission is to support the U.S. Department of Defense (DoD), the global education and training community has the potential to influence mobile learning designs being produced for Warfighters, as well as the U.S. government workforce. Therefore, the researchers distributed the survey to the largest possible audience (including to countries outside the U.S.) in order to increase the likelihood of a rich and diverse set of data and perspectives.

Our solicitation messages for the survey respondents stated that respondents were not required to have any prior experience with mobile learning design or development. The researchers also hoped to include education and training professionals who might have no intent to use mobile devices as part of their learning strategy, but have a problem or challenge that might benefit from a mobile learning solution.

3. Data Collection Methods

Data collection utilized a researcher-designed questionnaire providing quantitative and qualitative data. After development, the researchers employed a snowball sampling method to help identify other potential respondents of the target audience. The researchers asked the respondents to recommend the survey to others who might also meet the criteria. Snowball sampling is especially useful when trying to reach populations that are hard to find.

Self-selection alone may not generalize well to the target population due to the potential for not being representative (Andrews, Nonnecke, & Preece, 2003; Hutchinson, 2004). There is potential for some bias in the results as the survey respondents are allowed to decide entirely for themselves whether or not they want to participate in the survey. Since the ADL Initiative is a government-sponsored organization and incentives to the respondents can't be provided, a self-selection survey was used as the initial form of data collection. Based on the target audience and objectives of the needs assessment it was not feasible, practical, or theoretically sensible to conduct true random sampling. Therefore, the researchers followed multiple non-probability sampling approaches to attract the most representative responses of the target audience.

4. Instrument Design, Development, and Implementation

The data collection instrument consisted of a 32-item survey in the form of a questionnaire providing both quantitative data and short-answer qualitative data. To align with the project objectives, the questionnaire was designed taking into account each item and how it informs a specific objective allowing analysis to occur as three sub-surveys if desired. The quantitative items included multiple selection responses, ranking responses, and seven-point Likert items. Multiple selection responses consisted of subgroups where the respondent could select any or all of specific set of items in a subgroup for that response. Whether or not an item in the subgroup was selected produced a Boolean value which was recorded. Ranking responses also consisted of subgroupings of items per response.

Each item in a particular subgroup produced a numerical value equal to its ranking position. Depending on the number of items in the subgroup, the value ranges could vary with the highest value equal the total number of items in that subgroup. Using seven-point Likert responses was thought to provide a larger range of variability than traditional five-point responses. In addition, each Likert response included an additional value indicating that the response was not applicable to that particular respondent.

Qualitative data were gathered as pre-defined textual responses or free text in short answer type items. Each questionnaire response was aligned with one of the three major needs assessment categories, producing three sub-surveys. Demographic data describing organizational and response channel characteristics were also collected.

Formative evaluation in the form of beta testing was performed in a limited manner during instrument development for the items' alignment to the objectives, item clarification and readability, and technical implementation. However, the researchers did not test for construct validity.

The researchers administered the 32-question survey and made it available to the target audience for 30 days, from March 28, 2013 to April 26, 2013. Beta testing of the survey took place for two consecutive weeks prior to the launch of the survey and resulted in several refinements to the verbiage of the survey as well as improved instructions for the respondents to navigate through the survey. Several respondents initially reported issues with navigating the live survey, which forced each participant to answer each question before proceeding to the next one. In order to alleviate some of these challenges, the survey instrument was modified on April 10th, 2013 to allow respondents to freely navigate through the questions in the survey before submitting their answers.

5. Survey Protocols and Distribution

The information and data collected in this survey is intended to help form the basis for making informed decisions before strategically designing, developing, implementing, and evaluating any interventions to address the perceived needs. The researchers utilized internal distribution channels to initially gauge the potential interest of the target audience. A brief announcement about the project and plans for a needs analysis was posted to the ADL website on January 31st (<http://www.adlnet.gov/adl-to-conduct-mobile-learning-research-needs-analysis>). Over 300 people contacted the ADL mobile team via email (adlmobile@adlnet.gov) expressing their interest in the project and participating in the survey. See Appendix, Section 8.1 and 8.2 for further details about the distribution channels. The researchers publicized the survey using both external and internal distribution strategies to attract the widest number of qualified respondents spanning multiple countries and organizations to reach the target audience.

6. Data Analysis Procedures

The Data were imported into Statistical Product and Service Solutions (SPSS) software using each survey response item and response item subgroup as individual variables. All data were then analyzed using SPSS for descriptive statistics. As there was no need to look for group differences for this assessment no parametric analyses were run and no measures of statistical significance have been indicated. For multiple selection responses, frequency counts of each Boolean "true" were summed producing a profile of the item subgroup responses numerically and in percentages. For ranking items, numerical values assigned to each item in the subgroup items were used. These values were then averaged for a mean ranking value. For Likert type response items, mean values were used to indicate the strength of the responses with 1 being the least strong and 7 being the strongest. All NA responses were discarded from the analyses. Qualitative data were analyzed thematically for like subgroups for the potential of frequency counts for strength of responses. Otherwise these data were used anecdotally in this report.

7. Survey Instrument

The following are the questions presented in the survey. Each question is listed, followed by its Question Type and the Research Objective it addressed, using the format: Question (Question Type; Research Objective).

1. In what country is your primary residence? (Pull Down List; Demographic)

2. What is your gender? (Multiple Choice; Demographic)
3. What is your age? (Multiple Choice; Demographic)
4. What is the highest level of academic education you have completed? (Multiple Choice; Demographic)
5. Which of the following best describes your organization? (Multiple Response; Demographic)
6. What is the name of your organization? (Free Text Field; Demographic)
7. What is your primary role within your organization? (Multiple Choice; Demographic)
8. What is your job/position title? (Free Text Field; General)
9. How many years of experience do you have as a practitioner in the field of learning, education, or training? (Multiple Choice; General)
10. How many mobile learning projects have you worked on? (Multiple Choice; General)
11. Which mobile device do you use most often for learning? (Multiple Choice; General)
12. Which of the following mobile device capabilities have you seen used for learning (by yourself or others)? (Multiple Response; 1. Capabilities)
13. Which of the following mobile device capabilities have you incorporated in the design or implementation of a mobile learning solution? (Multiple Response; 1. Capabilities)
14. Which of the following mobile device capabilities would you like to have a better understanding of regarding their applicability for mobile learning? (Multiple Response; 1. Capabilities)
15. There is a general understanding within the education and training community about how and when to use the capabilities of mobile devices for learning. (Likert Scale; 1. Capabilities)
16. There is a general understanding within my organization about how and when to use the capabilities of mobile devices for learning. (Likert Scale; 1. Capabilities)
17. Mobile learning examples that are categorized by mobile capabilities could be helpful to the community in designing mobile learning projects. (Likert Scale; 1. Capabilities)
18. How important are the following methods of learning in terms of their promise for widespread, long-term use for mobile learning? (Rank Order; General)
19. Which of the following learning strategies holds the most promise for widespread, long-term use for mobile learning? (Multiple Response; General)
20. Which of the following mobile devices are best suited for delivering self-paced courses? (Rank Order; General)
21. Which of the following mobile devices are best suited for supporting blended classroom instruction? (Rank Order; General)
22. Which of the following mobile devices are best suited for delivering performance support? (Rank Order; General)
23. The overall learning strategy and instructional design should be re-evaluated when converting elearning courses and other learning materials to a mobile format. (Likert Scale; 2. Alternative learning approaches)
24. For which of the following performance support approaches is there a lack of understanding of how and when to

include them in a mobile learning project? (Multiple Response; 2. Alternative learning approaches)

25. For which of the following informal learning scenarios is there a lack of understanding of how and when to include them in a mobile learning project? (Multiple Response; 2. Alternative learning approaches)
26. An understanding of designing for smaller screens and touch interactivity is sufficient for designing effective mobile learning. (Likert Scale; 2. Alternative learning approaches)
27. Is there a particular design process/model that you are aware of (but have not applied) that has potential for creating effective mobile learning? (Multiple Choice/Free text Field; 3. Workflow process / model or guidelines)
28. Is there a particular design process/model that you have applied to a mobile learning project? (Multiple Choice/Free text Field; 3. Workflow process / model or guidelines)
29. A new design workflow process/model optimized for mobile learning could improve my ability to contribute to education or training projects. (Likert Scale; 3. Workflow process / model or guidelines)
30. There is a general lack of best practices or guidelines for designing mobile learning. (Likert Scale; 3. Workflow process / model or guidelines)
31. The instructional design process for mobile learning should be different from the instructional design process for traditional elearning. (Likert Scale; 3. Workflow process / model or guidelines)
32. From which of the following sources did you hear about this survey? (Multiple Response; General)

8. Protocols and Distribution

8.1. Internal Survey Channels

The researchers distributed the survey to the following internal contact channels:

- The ADL Newsletter (3,945 subscribers)
- The ADL Mobile Learning Newsletter (500+ subscribers)
- The ADL Twitter Account: http://twitter.com/@ADL_Initiative (1,430 followers)
- The ADL Mobile Twitter Account: <http://twitter.com/@ADLmobile> (360 followers)
- ADL Group: <http://www.linkedin.com/groups?gid=2386016> (1,569 members)
- DADL Group: <http://www.linkedin.com/groups?gid=2772574> (122 members)
- Personal Twitter Account: <http://twitter.com/@mobilejson> (1,230 followers)
- 174 personal email contacts involved in or who have expressed interest in mobile learning at previous conferences or events

8.2. External Survey Channels

The researchers also coordinated the distribution of an announcement and link for the survey to the following education and training organizations' professional membership channels:

- ASTD distributed an announcement and link to the survey in their Learning Technology Newsletter, which was sent via email subscription to more than 20,000 contacts on April 9th, 2013. The announcement was not the only news featured in the newsletter as there were several other stories placed above the announcement. ASTD also tweeted about the survey using their twitter account, <http://twitter.com/astd> and also Justin Brusino's account, <http://twitter.com/astdlearntech>.
- The ELearning Guild also designated a section of their eLearning Insider email-based subscription newsletter to the announcement and survey on April 8, 2013. The circulation for the eLearning Insider is unknown.
- ELearning! Magazine sent one dedicated email invite to about 60,000 eSubscribers. They sent a second invite

within their Elearning! Enews as a news item with a circulation 52,000. In addition, they also sent the invite to the Federal Government Distance Learning Association (FGDLA) members list of approximately 400 contacts.

- The MASIE Learning Consortium distributed an email message to 230 organizational contacts.
- The researchers coordinated an email message with the Society for Applied Learning Technology (SALT) organization. SALT sent a dedicated email message about the project and a link to the survey to about 80,000 contacts and about 12,000 members (92,000 total).
- The researchers sent an email message about the project and a link to the survey to the International Society for Technology in Education (Special Interest Group for Mobile Learning) mailing list.
- The researchers sent an email message about the project and a link to the survey to the International Association for Mobile Learning (IAMLEARN) membership list.
- The researchers coordinated an email message about the project and a link to the survey to be sent to the Consortium for School Networking (CoSN)'s mobile learning group. They sent it to 835 people.
- The researchers coordinated announcing the survey during the Instructional Design for Mobile Learning (IMDL) Massive Online Open Course (MOOC), <https://learn.canvas.net/courses/46>. Over 700 people registered for this MOOC.

In addition, the researchers posted to the discussion area on several LinkedIn groups that would have the most potential or interest in this mobile learning project. An announcement message and link to the survey was shared with the following groups:

- Association for Computing Machinery (ACM) Mobile Special Interest Group (SIG): <http://www.linkedin.com/groups?gid=2574763> (435 members)
- Association for Educational Communications and Technology (AECT): <http://www.linkedin.com/groups?gid=55502> (2,520)
- Aviation Industry CBT Committee (AICC): <http://www.linkedin.com/groups?gid=87811> (362)
- Design for Mobile: <http://www.linkedin.com/groups?home=&gid=98404> (4,582)
- DevLearn: <http://www.linkedin.com/groups?gid=3123931> (630)
- Distance Learning and Digital Technologies (DLDT): <http://www.linkedin.com/groups?home=&gid=1881557> (1,644)
- EduDecisions Online Education & Distance Learning Community: <http://www.linkedin.com/groups?gid=1006387> (492)
- ACM's eLearn Magazine: <http://www.linkedin.com/groups?home=&gid=3658283> (184)
- Learning-Education-Training Systems Interoperability (LETSI): <http://www.linkedin.com/groups?home=&gid=121125> (771)
- Handheld Learning Group: <http://www.linkedin.com/groups?gid=137892> (2,427)
- International Association for Mobile Learning (IAMLEARN): <http://www.linkedin.com/groups?home=&gid=4867890> (17)
- IAMLEARN Mobile Assisted Language Learning (MALL) SIG: <http://www.linkedin.com/groups?home=&gid=4690642> (52)
- Instructional Design and E-Learning Professionals' Group: <http://www.linkedin.com/groups?gid=110953> (46,481)
- International Society for Technology in Education (ISTE): <http://www.linkedin.com/groups?gid=2811> (33,738)
- iPad Mobile Learning: <http://www.linkedin.com/groups?gid=2990499> (1,299)
- iTrivio Mobile learning and elearning: <http://www.linkedin.com/groups?home=&gid=2074816> (1,095)
- Learning, Education, and Training Professionals: <http://www.linkedin.com/groups?gid=27003> (113, 025)
- Learning Without Frontiers: <http://www.linkedin.com/groups?gid=3141501> (4,953)
- mLearnCon: <http://www.linkedin.com/groups?gid=2659151> (553)
- Mobile Learning Global Consortium: <http://www.linkedin.com/groups?gid=78975> (1,097)
- Mobile Learning In Education: <http://www.linkedin.com/groups?gid=1881768> (1,784)
- Mobile Learning Into the Future: <http://www.linkedin.com/groups?gid=2301553> (1,731)
- Society for Applied Learning Technology (SALT): <http://www.linkedin.com/groups?gid=2244918> (1,299)
- The eLearning Guild: <http://www.linkedin.com/groups?gid=102144> (33,657)

9. Qualitative Data Analysis

This section of the Appendix presents an analysis of the qualitative data collected from text fields in the survey. There

were 13 such fields; most were questions where the researchers provided a text field option to provide more details on questions where respondents selected the “Other” answer option. The remaining text fields were included as the only answer option to a question in the survey, to capture information that was unique to the individual in some way, and/or that the research team could not reasonably predict in advance (for example, Question 4, which asked for the name of their degree program).

9.1 Question 4: “Please indicate degree/program of study if applicable”

This question was an extension to the original question: “What is the highest level of academic education you have completed?” The free text field for this question allowed users to indicate their degree/program of study. The research team did not feel that trying to present a comprehensive list of all degree subjects for respondents to choose from would be practical, hence the research team provided this free text field.

The total number of respondents who provided a free text entry for this question was 369, which is 44% of the total respondents (831). Our assumption is that, of those that did not respond, there was a mix of those who did not want to respond and those who did not have the time to answer this question.

The team codified and normalized the free text responses into categories for this question. The normalized category list for this question was an attempt to strike a balance between coarse “rounding off” of data into a few broad categories and retaining the individual integrity of the original user responses (reducing the possibility of making generalizations).

The normalized free text responses fell into these categories, which are reflected in the quantitative analysis portion of the survey results:

• Instructional Design/Learning Technology	41%
• Education	13%
• Computer Science/IT	12%
• Business Administration	5%
• Organization Management	4%
• Psychology	4%
• Language	3%
• Other	18%

The 18% “Other” category above consists of several degree subjects that do not fit into the categories the research team developed and could not be grouped with each other in a meaningful way.

Because of the nature of the organizations the research team recruited to help promote and announce the survey for the widest possible relevant distribution, the survey received many responses from Instructional Designers. Instructional designers arguably have the most interest and stake regarding the subject matter of the survey and the products of the MoTIF project.

It is also not surprising that Education was the second most common degree program reported, for the same reason as above. Finally, computer science professionals are often involved in developing e-learning, so their standing of third most popular is not surprising.

This is in a sense a validation of the audience targeting strategy of the survey, since it shows that it includes those professionals who have most knowledge of, practical experience with, and academic or professional training in the topics of the MoTIF project.

It is also important to keep in mind, in reading the survey results, that these are the people who may have a strong bias in one direction or another as regards technology-enabled learning, due to their previous education, work experiences, and training in the topics of the survey.

9.2. Question 5: “Which of the following best describes your organization? (Select all that apply)”

The “Other” (please describe)” option for this question allowed users to define an organization or organization category that they felt was not represented on the pre-defined list.

The total number of respondents to this question was 54, which is 6% of the total respondents (831). Thus, 6% of the respondents did not feel that their organization could be described in terms of the categories the research team provided. None of the respondents selected "Other" without entering a description; all respondents provided a description of their "Other" organization.

The pre-defined categories for this question were:

- Commercial
- Primary Education
- Secondary Education
- Higher Education
- Govt contractor
- Independent
- Non-profit
- Non-U.S. govt
- State/local govt
- US Fed govt

Upon analysis, the team found that all of the free text responses except two could actually be categorized into one of the pre-defined categories shown in the list above. These respondents may have not read the pre-defined categories carefully enough, ignored them, or misinterpreted them. The researchers normalized these responses for this question by placing the response in the appropriate pre-defined category. Thus, all of the respondent's answers are reflected in the quantitative analysis portion of the survey results. The remaining two true "Other" entries were "Self-employed" and "Currently not involved in an organization".

The 54 respondents that answered "Other" represented only 6% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately represented, giving respondents an acceptable range of options for their answer. However, the fact that the vast majority of this 6% (52 respondents) mistakenly (in our view) considered their response as "Other" may reflect some lack of conciseness and clarity in the wording of the pre-defined category names.

9.3. Question 7: "What is your primary role within your organization?"

The "Other" (please describe)" option for this question allowed users to define a role or role category that they felt was not represented on the list.

The total number of respondents to this question who characterized their role as "Other" and provided a description is 118, representing 14% of the total sample (831). Of these, the team was able to normalize 52 of the responses into the pre-defined categories for this question, representing 6% of the total sample and 44% of the 118 who answered "Other." This left 66 (8% of the total sample, 56% of those who answered "Other") that we could not normalize into the pre-defined categories.

The pre-defined answer categories presented were the following:

- Educator: a teacher or professor of a specialized subject in an educational setting to include both online environments and physical classrooms.
- Human Performance Technologist: one who is certified in Human Performance Technology (HPT) and has experience with applying the HPT model in education and training settings.
- Instructional Designer: one who creates planned learning experiences with the goal of the learner acquiring knowledge or skills.
- Instructor/Trainer: one who prepares or guides learners toward specific vocational or training objectives that satisfy job-related tasks or skills.
- Learning Content Creator: anyone responsible for creating media assets to support a learning experience.

- Manager: one who directs, controls, or manages the business operations of a team, program, or organization focused on education or training goals.
- Researcher: one who conducts research into theory and best practices for developing education, instruction, or training materials.
- Student: (education or training-related program, including interns)
- Student: (non-education or training program)

As with Question 4, the normalized category list for the “Other” responses was an attempt to strike a balance between coarse “rounding off” of data and retaining the individual integrity of the original user responses. The normalized responses (that were truly not reflected on the pre-defined list) were categorized as follows. Percentage figures are percent of the number of “Other” responses that were not normalized into the pre-defined list:

- | | |
|--|-----|
| • [Multiple roles - no primary one apparent] | 35% |
| • LMS Administrator | 9% |
| • Consultant | 5% |
| • Technical Writer | 5% |
| • “True” Other | 46% |

The “True” Other category above represents roles that the research team felt were unique and too difficult to categorize in a meaningful way.

The somewhat high percentage of those who answered “Other” (14%) on this question (especially compared to Question 5) could be seen as indicating a shortcoming in the design of the category list (i.e., not complete enough of a set of predefined answer options). However, as described above, of those, about half (44%) the research team felt were actually not “Other” roles but belonged in a pre-defined category. Perhaps clearer wording would have addressed this. Of the remainder (i.e., ones that the research team could not normalize into pre-defined categories), only three categories stood out as possible additions to the original pre-defined list: “LMS Administrator,” “Consultant,” and “Technical Writer,” as indicated above.

Of these three categories, “LMS Administrator” is most significant. This attests to the still central role that LMSs play in the learning space, and the significant workload of being an administrator of one (leading to people’s characterization of that as their primary work role).

The research team feels that the “True” Other category is so high simply because it is inherently difficult to categorize the myriad of roles that learning professionals are engaged in.

9.4. Question 12: “Which of the following mobile device capabilities have you seen used for learning (by yourself or others)? (Select all that apply)”

The “Other” (please describe)” option for this question allowed respondents to define a mobile device capability that they felt was not represented on the list.

Forty-seven respondents to this question characterized their role as “Other” by providing a free text description of “Other.” No respondents answered “Other” without providing a free text explanation. 30 of these did not select the “Other” option, they simply wrote in their description of “Other.” The fact that they could write in a description of “Other” without selecting the “Other” option (or vice versa) was a limitation in the software used for the survey; respondents should have been forced to check the “Other” option if they wrote something in the “please describe” field, and vice versa, before leaving the screen. For purposes of analyzing results, the research team considered the Other option selected if the respondent entered text in the “please describe” field. No respondents checked “Other” without entering text in that field.

The 47 that (effectively, per caveat above) answered “Other” represented 6% of the total sample (831). Thirteen (28%) of these respondents actually already had selected items in the pre-defined list that the research team felt matched

their free text entry. These were not therefore considered as truly “Other” entries, since they were already accounted for in the respondent’s selection of pre-defined options.

This left 34 responses. Upon analysis of these, the team determined that 5 of them could be counted as falling into the pre-defined options, so the research team removed them from “Other” status and made the appropriate selection for them (i.e., normalized them). 11 of them were not device capabilities, but app capabilities, thus did not fit into scope of the pre-defined categories (see below), so the research team did not consider these as true “Other” responses.

The remaining 18 responses were judged as “NA”, meaning that their answer was not a mobile app or device capability, or too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question). They were not counted therefore as “Other” responses.

The 47 that answered “Other” represented only 6% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

The pre-defined answer options presented for this question were the following:

- None
- Camera
- Doc viewer
- Geolocation
- Internal sensors
- Media viewer
- Microphone
- Notification
- Search
- Short-range communication
- Text message
- Touchscreen interaction
- Voice/phone

As described above, the research team found that there were two categories for some of the “Other” responses: device capabilities, and app capabilities. The question was intended by the team to address device, i.e., hardware, capabilities only, since the research team were focused on unique aspects of the mobile device itself (vs. desktop computers) rather than software running on it, which, on a smartphone or tablet, can often match the capabilities of desktop computer software and are thus not unique to mobile devices. Also, app capabilities are so numerous and various that they defy categorization in a list as presented in this question.

The research team hoped to convey the question’s intent to respondents through the use of the wording “mobile device capabilities,” but were not entirely successful since many did enter app capabilities. The research team note both sets of capabilities in the list below, since the research team feel that some of the information was valuable to our research.

9.4.1 Device capabilities

All of these responses the research team judged to be falling within the pre-defined list of categories, and the research team made sure that those category answers were selected so that they were accounted for in the data, but it is interesting to note them here. These responses are in most cases the exact verbiage used by the respondent, although shortened and simplified in some cases. Although these responses were normalized to the pre-defined categories as shown, the research team feels that it is important to call them out, since they could be useful in formulating guidance and references that result from MoTIF research.

- 3D graphics (normalized to “Media viewer” category)
- Simulations (normalized to “Media viewer” category)
- 3D games (normalized to “Media viewer” category)
- Voice search (normalized to “Search” category)
- Voice recognition (normalized to “Microphone” category)

9.4.2 App capabilities

None of these were accounted for in the pre-defined list of categories, since they are not inherent in mobile device hardware. Therefore, the research team did not normalize these answers to fit them into the pre-defined list of capabilities. These responses were generalized to describe general categories of software functions. In other words, the list below is not the exact verbiage used by the respondent. For example, "Facebook" was generalized to "Social media."

- Social media (4 responses)
- Dictation
- Email
- MOOC environment
- Messaging
- Micro LMS
- Polling
- Video conferencing

Along with the device capability list above (as well as the predefined list for this question), these app capabilities will be evaluated (in follow-on MoTIF project phases) for inclusion in any catalogs of mobile learning use cases (a product under consideration as a MoTIF product), as capabilities that designers should consider for use in their mobile learning.

9.5. Question 13: "Which of the following mobile device capabilities have you incorporated in the design or implementation of a mobile learning solution? (Select all that apply)"

The "Other" (please describe)" option for this question allowed respondents to define a mobile device capability that they felt was not represented on the list.

Thirty-one respondents to this question characterized their role as "Other" by providing a free text description of "Other." No respondents answered "Other" without providing a free text explanation. 10 of these 31 did not select the "Other" option, they simply wrote in their description of "Other." As described for Question 12, the fact that they could write in a description of "Other" without selecting the "Other" option (or vice versa) was a limitation in the software used for the survey.

The 31 that (effectively, per caveat above) answered "Other" represented 4% of the total sample (831). Six (19%) of these respondents actually already had selected items in the pre-defined list that the research team felt matched their free text entry. These were not therefore considered as truly "Other" entries.

This left 25 responses. Upon analysis of these, the team determined that one of them could be counted as falling into the pre-defined options, so the research team removed it from "Other" status and made the appropriate selection for it (i.e., normalized it). 6 of them were not device capabilities, but app capabilities, thus did not fit into scope of the pre-defined categories (see below), so the research team did not consider these as true "Other" responses.

The remaining 18 responses were judged as "NA", meaning that their answer was not a mobile app or device capability, or too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question). They were not counted therefore as true "Other" responses.

Contrary to Question 12, therefore, there were no uniquely "Other" device capabilities entered by respondents, and only one device capability that was normalized. This is reflected in the analysis below.

The pre-defined answer options presented for this question were the same as those described above in Question 12. Also see discussion of device capabilities vs. app capabilities above in "Analysis of data" for Question 12.

The 31 that answered "Other" represented only 4% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

9.5.1 Device capabilities

This response is the exact verbiage used by the respondent. As with Question 12, although this response was normalized (i.e., the research team did not consider it to be a unique, new, category) to the pre-defined category as shown, we feel that it is important to call it out, since it could be useful in formulating guidance and references that result from MoTIF research.

- 3D graphics (normalized to “Media viewer” category)

9.5.2 App capabilities

As with Question 12, the research team did not normalize these answers to fit them into the pre-defined list of capabilities to account for these responses. These responses were generalized to describe general categories of software functions. In other words, the list below is not the exact verbiage used by the respondent; it is changed to be more concise and categorical of more than one response.

- Micro LMS (2 responses)
- Polling (2 responses)
- Screen capture
- Social media

Note that all of these except for “Screen capture” are shared with the list in Q12. Generating a cumulative list of app capabilities that respondents have seen or thought about, the research team thus has compiled the following (combined for Question 12 and 13):

- Social media (5 responses)
- Micro LMS (3 responses)
- Polling (3 responses)
- Dictation
- Email
- Messaging
- MOOC environment
- Screen capture
- Video conferencing

As with Question 12, along with the device capability list above (as well as the predefined list for this question), these app capabilities will be evaluated (in follow-on MoTIF project phases) for inclusion in any catalogs of mobile learning use cases (a product under consideration as a MoTIF product), as capabilities that designers should consider for use in their mobile learning.

9.6. Question 14: “Which of the following mobile device capabilities would you like to have a better understanding of regarding their applicability for mobile learning (Select all that apply)”

As with Question 12 and 13, the “Other” (please describe)” option for this question allowed respondents to define a mobile device capability that they felt was not represented on the list.

Thirty-nine respondents to this question characterized their role as “Other” by providing a free text description of “Other.” No respondents answered “Other” without providing a free text explanation. 15 of these 39 did not select the “Other” option, they simply wrote in their description of “Other.” As described for Question 12, the fact that they could write in a description of “Other” without selecting the “Other” option (or vice versa) was a limitation in the software used for the survey.

The 39 that (effectively, per caveat above) answered “Other” represented 5% of the total sample (831). Six (15%) of these respondents actually already had selected items in the pre-defined list that the research team felt matched their free text entry. These were not therefore considered as truly “Other” entries.

This left 33 responses. Upon analysis of these, the team determined that 8 of them could be counted as falling into the pre-defined options, so the research team removed them from “Other” status and made the appropriate selection for

them (i.e., normalized them). Six of them were not device capabilities, but app capabilities, thus did not fit into scope of the pre-defined categories (see below), so the research team did not consider these as true “Other” responses.

The remaining 19 responses were judged as “NA,” meaning that their answer was not a mobile app or device capability, or too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question). They were not counted therefore as true “Other” responses.

The 39 that answered “Other” represented only 5% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

The pre-defined answer options presented for this question were the same as those described above in Question 12. Also see discussion of device capabilities vs. app capabilities above in “Analysis of data” for Question 12.

All device capabilities entered by respondents (8) were normalized; none were seen by the team as unique capabilities. Also, they were worded to be so similar to an item in the pre-defined list that the research team felt it was redundant to generalize them (as in Question 12 and 13). Therefore no device capabilities are listed here.

9.6.1 App capabilities

As with Question 12 and 13, the research team did not normalize these answers to fit them into the pre-defined list of capabilities to account for these responses. These responses were generalized to describe general categories of software functions.

- Micro LMS (2 responses)
- Haptic functions
- Messaging
- Social media
- Video conferencing

Note that all of these except for “Haptic functions” are shared with the combined lists in Q12 and Q13. Generating a cumulative list of app capabilities that respondents have seen or thought about, the research team provided the following (combined for Question 12, 13, and 14):

- Social media (6 responses)
- Micro LMS (5 responses)
- Polling (3 responses)
- Video conferencing (2 responses)
- Messaging (2 responses)
- Dictation
- Email
- Haptic functions
- MOOC environment
- Screen capture

As with Question 12 and 13, along with the device capability list above (as well as the predefined list for this question), these app capabilities will be evaluated (in follow-on project phases) for inclusion in any catalogs of mobile learning use cases as capabilities that designers should consider for use in their mobile learning.

9.7. Question 19: “Which of the following learning strategies holds the most promise for widespread, long-term use for mobile learning? (Select up to three choices)”

The “Other (describe)” option for this question allowed respondents to define a learning strategy that they felt was not represented on the list.

Seventeen respondents to this question characterized their role as “Other” by providing a free text description of “Other.” No respondents answered “Other” without providing a free text explanation. 4 of these 17 did not select the “Other” option, they simply wrote in their description of “Other.” As described for Question 12, the fact that they could write in

a description of “Other” without selecting the “Other” option (or vice versa) was a limitation in the software used for the survey.

The 17 that (effectively, per caveat above) answered “Other” represented 2% of the total sample (831). Three (18%) of these respondents actually already had selected items in the pre-defined list that the research team felt matched their free text entry. These were not therefore considered as truly “Other” entries.

This left 14 responses. Upon analysis of these, the team determined that 1 of them could be counted as falling into the pre-defined options, so the research team removed it from “Other” status and made the appropriate selection for it (i.e., normalized it).

10 of the remaining 13 responses were judged as “NA”, meaning that their answer was not a learning strategy, too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question), or a statement of opinion that was not offering an “Other” learning strategy. They were not counted therefore as true “Other” responses.

This left three responses that contained true “Other” entries. They are summarized below.

The 17 that answered “Other” represented only 2% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

The pre-defined answer options for this question were the following:

- Blended learning
- Classroom augmentation
- Contextual learning
- Game-based learning
- Just-in-time learning
- Media push
- Personal learning networks
- Search-based learning
- Self-paced courses
- Simulation-based learning
- Social media-based learning
- Spaced learning

As described above, three responses contained true “Other” entries. These responses were generalized to describe general categories of software functions. In other words, the list below is not the exact verbiage used by the respondent.

- Environmental model
- Micro-assessments
- On-demand learning (in an educational context)
- Surveys

“Surveys” and “Micro-assessments” were both contained in one respondent’s answer; as stated above, there were actually only three respondents who had uniquely “Other” responses.

These learning strategies will be evaluated (in follow-on MoTIF project phases) for use as defining characteristics for items included any catalogs of mobile learning use cases (a product under consideration as a MoTIF product), as learning strategies that designers should consider for use in their mobile learning.

In this free text field, respondents voiced opinions about mobile learning in general and the survey. The research team feel these comments are valuable for our design research continuous improvement and capturing opinions (the whole point of the survey), even though they diverged from strict answering of the question at hand.

The following is a summary of these comments for this question. Each is shortened to a concise form. In some cases, several ideas were expressed in one comment. Each idea is listed separately.

- All of these strategies provide value, depending on the context.
- Need a way to marry 'learning styles' with 'teaching styles' for individuals
- Mobile learning is not a legitimate long term learning solution
- Spaced learning, social media-based learning are all intertwined with the need for just-in-time learning and media push
- All of these strategies need to be used in a multi-mode approach. How the lecturer manages it makes the difference.
- More than three have the potential for widespread, long-term use.
- Not sure that all of these are learning strategies rather than delivery methods
- There may be even more strategies that would be appropriate, e.g., role playing, collaboration, etc.
- None of the above are learning strategies
- "Media Push" is a misnomer. Podcasts and YouTube are not always pushed by subscription, but found and pulled/consumed by user via search.
- Mobile increases likelihood of meeting user at point of need (context + desire + access).

9.8. Question 24: "Which of the following performance support approaches is there a lack of understanding for how and when to include them in a mobile learning project? (Select all that apply)"

The "Other (describe)" option for this question allowed respondents to define a performance support approach that they felt was not represented on the list.

62 respondents to this question characterized their role as "Other" by providing a free text description of "Other" and/or selecting the "Other" option. 5 of these 62 answered "Other" but did not provide any free text explanation. 6 of these did not select the "Other" option, they simply wrote in their description of "Other." As described for Question 12, the fact that they could write in a description of "Other" without selecting the "Other" option (or vice versa) was a limitation in the software used for the survey.

The 62 that (effectively, per caveat above) answered "Other" represented 7% of the total sample (831).

None of these respondents actually already had selected items in the pre-defined list that the research team felt matched their free text entry; we did not therefore remove any "Other" entries on this basis.

Upon analysis, the team determined that 1 "Other" free text entry could be counted as falling into the pre-defined options, so the research team removed it from "Other" status and made the appropriate selection for it (i.e., normalized it).

50 of the remaining 61 responses were judged as "NA", meaning that their answer was not a performance support approach, too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question), or a statement of opinion that was not offering an "Other" performance support approach. They were not counted therefore as true "Other" responses.

This left 11 responses that contained true "Other" entries. They are summarized below.

The 62 that answered "Other" represented only 7% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

The pre-defined answer options for this question were the following:

- Checklists
- Decision support tools
- Example catalogs
- Infobases/knowledge bases
- Job aids
- Lessons learned repositories
- Online Help systems
- Quick references

As described above, 11 responses contained true “Other” entries. These responses were generalized to describe general categories of software functions. In other words, the list below is not the exact verbiage used by the respondent.

- Online evaluation services (2 responses)
- Simulations (2 responses)
- SME access (2 responses)
- Authoring systems for performance-based reports
- Augmented reality
- QR codes
- Procedural support
- Peer-to-peer consultation

These performance support approaches will be evaluated (in follow-on MoTIF project phases) for use as defining characteristics for items included any catalogs of mobile learning use cases (a product under consideration as a MoTIF product), as learning strategies that designers should consider for use in their mobile learning.

As with Question 19, respondents took this free text opportunity to voice opinions about mobile learning in general and about the survey. The research team feel these comments are valuable for our design research continuous improvement and capturing opinions (the whole point of the survey), even though they diverged from strict answering of the question at hand.

The following is a summary of these comments for this question. Each is shortened to a concise form. In some cases, several ideas were expressed in one comment. Each idea is listed separately.

- Can’t respond (some variation of not understanding the subject matter or question) (29 responses)
- People ignore or misunderstand performance support approaches in general (4 responses)
- The approach depends on many factors (need front end analysis) (2 responses)
- Too much reliance on “tools” without ongoing support
- Too much miniaturization for mobile, not enough optimization, which means reduction of information
- These do not focus on changing attitudes, awareness and semi-conscious performance

The fact that there were so many “Can’t respond” responses points to the possibility of shortcomings in the scope or construction of the question; there are too many to be dismissed as simply the usual presence in any survey question of a few outliers.

The team speculates that a simple lack of familiarity with performance support prompted most of these responses (especially in terms of the individual approaches presented in this question). The training world (which the survey respondent population is pulled from) is still very focused on traditional training models. Performance support is still not “mainstream” or fully accepted. Many assume that training is the best way to produce “day one performance,” since all of the learning usually happens before the user actually starts doing the tasks they are trained on. Stakeholders are not comfortable with the idea of learning on the job (i.e., aided by performance support). Performance support tacitly presumes, to many, that performers will make many mistakes or not know what to do next. This idea strikes fear in the

minds of many stakeholders and causes them to focus their efforts on training in advance of performance rather than support during performance.

Instead of focusing on individual performance support approaches, perhaps this question should have addressed performance support in general, without addressing specific approaches. Also, it might have helped to include a clear definition of performance support (with the list of approaches the research team actually used in the question as examples).

9.9. Question 25: Which of the following informal learning scenarios is there a lack of understanding for how and when to include them in a mobile learning project? (Select all that apply)"

The "Other (describe)" option for this question allowed respondents to define an informal learning scenario that they felt was not represented on the list.

34 respondents to this question characterized their role as "Other" by providing a free text description of "Other" and/or selecting the "Other" option. 3 of these 34 answered "Other" but did not provide any free text explanation. 6 of these did not select the "Other" option, they simply wrote in their description of "Other." As described for Question 12, the fact that they could write in a description of "Other" without selecting the "Other" option (or vice versa) was a limitation in the software used for the survey.

The 34 that (effectively, per caveat above) answered "Other" represented 4% of the total sample (831).

Upon analysis, the team determined that 1 "Other" free text entry could be counted as falling into the pre-defined options, so the research team removed it from "Other" status and made the appropriate selection (i.e., normalization).

Thirty of the remaining 32 responses were judged as "NA", meaning that their answer was not a informal learning scenario, too vaguely worded and thus not meaningful or categorizable in terms of the scope of the pre-defined list (or the intent of the question), or a statement of opinion that was not offering an "Other" informal learning scenario. They were not counted therefore as true "Other" responses.

This left 2 responses that contained true "Other" entries. They are summarized below.

The 34 that answered "Other" represented only 4% of the total sample (831). Such a small number suggests that our pre-defined categories were adequately all-encompassing, giving respondents a conceptually comprehensive range of options for their answer.

The pre-defined answer options for this question were the following:

- Collaborative learning
- Expert consultations
- Independent study
- Mentoring
- Social media-based learning
- User-generated content sharing

As described above, 2 responses contained true "Other" entries. These responses were the following (shortened for conciseness).

- Virtual field trips
- Communities of Practice (CoPs)

These informal learning scenarios will be evaluated (in follow-on MoTIF project phases) for use as defining characteristics for items included any catalogs of mobile learning use cases (a product under consideration as a MoTIF product), as learning scenarios that designers should consider for use in their mobile learning.

As with Question 19 and 24, respondents took this free text opportunity to voice opinions about mobile learning in general and the survey. The research team feel these comments are valuable for our design research continuous improvement and capturing opinions (the whole point of the survey), even though they diverged from strict answering

of the question at hand.

The following is a summary of these comments for this question. Each is shortened to a concise form. In some cases, several ideas were expressed in one comment. Each idea is listed separately.

- Can't respond (some variation of not understanding the subject matter or question) (18 responses)
- Using cloud storage for references
- Almost none
- All are covered pretty well in industry conferences
- Experts may not agree on outcomes and measurements of informal learning
- [lack of understanding] may be a function of the individual's suite of learning environments and tools.
- eLearning Modules and other eLearning content development tools
- Search engines are poorly indexed
- augmented reality and QR codes
- anchored learning opportunities
- all
- Informal learning is about offering contexts and content that will be used/consumed at a learner's point of need.
- Question is situational dependent
- The instructional design community has not come to a consensus

9.10. Question 27: "Is there a particular design process/model that you are aware of (but have not applied) that has potential for creating effective mobile learning? (If YES, please describe the model)"

The free text field for this question allowed users to indicate a design process/model. The research team did not feel that trying to present a comprehensive list of all design processes/models for respondents to choose from would be practical, hence the research team provided this free text field.

The total number of respondents who provided a free text entry for this question was 78, which is 9% of the total respondents (831). Seventy of these checked the "Yes" box, four checked the "No" box but provided free text anyway, three checked the "Not sure" box and provided free text anyway, and one provided free text without checking any of the options. Thirteen respondents answered "Yes" without providing any free text description. Our assumption is that, of those that did not respond, there was a mix of those who did not want to respond and those who did not have the time to answer this question.

The team normalized the free text responses into categories for this question. The normalized category list for this question was an attempt to strike a balance between coarse "rounding off" of data into a few broad categories and retaining the individual integrity of the original user responses (reducing the possibility of making generalizations).

52 responses were judged to be NA, meaning that they were either not a design process/model or somehow not pertinent to the question.

The normalized free text responses fell into these categories, which are reflected in the quantitative analysis portion of the survey results. A few respondents listed more than one model; each model is listed separately in this list.

- ADDIE (6 responses)
- SAM (Successive Approximation Model) (4 responses)
- Dick & Carey (2 responses)
- Clark Quinn (2 responses)
- ADL Mobile Learning Handbook
- Participatory design model
- Environment model
- Knowledge management
- Apple ACOT
- Iterative design
- Contextual design
- Visual engagement mapping
- Self-created
- UX Design
- Gary Woodill
- PAF (Presentation, Application, Feedback)
- SRIA
- Yelon's Goal-centered design
- ARCS (Attention, Relevance, Confidence, Satisfaction) Model
- Merrill
- Kemp
- LRM/Learning Utility Activity Based Learning (Cathy Moore)

9.11. Question 28: "Is there a particular design process/model that you have applied to a mobile learning project? (If YES, please describe the model)"

The free text field for this question allowed users to indicate a design process/model. As with the previous question, the research team did not feel that trying to present a comprehensive list of all design processes/models for respondents to choose from would be practical, hence the research team provided this free text field.

The total number of respondents who provided a free text entry for this question was 139, which is 17% of the total respondents (831). 138 of these checked the "Yes" box, one checked the "No" box but provided free text anyway. None checked the "Not sure" box or no box at all and provided free text anyway (as was the case with some respondents in the previous question). 26 respondents answered "Yes" without providing any free text description. Our assumption is that, of those that did not respond, there was a mix of those who did not want to respond and those who did not have the time to answer this question.

The team normalized the free text responses into categories for this question. As with the previous question, the normalized category list for this question was an attempt to strike a balance between coarse "rounding off" of data into a few broad categories and retaining the individual integrity of the original user responses (reducing the possibility of making generalizations).

Sixty-seven responses were judged to be NA, meaning that they were either not a design process/model or somehow not pertinent to the question.

The normalized free text responses fell into these categories, which are reflected in the quantitative analysis portion of the survey results. A few respondents listed more than one model; these are treated separately in this list.

- ADDIE (33 responses)
- Agile (11 responses)
- Self-created (7 responses)
- Dick & Carey (3 responses)
- SAM (Successive Approximation Model) (2 responses)
- Hybrid
- Apple ACOT
- Task-oriented design
- Visual engagement mapping
- PAF (Presentation, Application, Feedback)
- Yelon's Goal-centered design
- LRM/.Learning Utility
- Collaborative Situated Active mLearning (CSAM)
- ASSURE model
- Cognitive Apprenticeship
- Behavioral Engineering Model
- HPT (Human Performance Technology)
- User-centered design
- Teaching for Understanding
- Design-based research
- S3D - Float Learning
- Frame Model (Koole, 2009)
- Gagne
- Significant Learning Experiences
- Activity Theory based design
- PlanDoCheckAct
- HCD (Human Centered Design)
- Kolb's learning styles model
- Constructivist instructional design
- Universal Instructional Design

9.12. Question 32: "From which of the following sources did you hear about this survey?"

The "Other" (please describe)" option for this question allowed users to define a source that they felt was not represented on the pre-defined list.

The total number of respondents who provided a free text answer to this question was 105, which is 13% of the total respondents (831). This includes 15 respondents who did not check the "Other" box. No respondents selected "Other" but did not enter a description; all respondents provided a description of their "Other" source.

The pre-defined categories for this question were:

- ADL channels (Website, email, social media)
- Professional organization channels (Website, email, social media)
- Industry news media
- Word of mouth

Upon analysis, the team found that all 105 of the free text responses except two (see below) could actually be categorized into one of the pre-defined categories shown in the list above. These respondents either did not read the pre-defined categories carefully enough, ignored them, or misinterpreted them. The team normalized these responses for this question by placing their response in the appropriate pre-defined category.

The two the research team could not normalize were "NONE" and "My own research and thinking."

The fact that over 10% of the respondents (13%) mistakenly (in our view) considered their response as "Other" may

reflect some lack of conciseness and clarity in the wording of the pre-defined category names.

9.13. Question 33: “I or my organization is a member of the following professional organizations”

The “Other” (please describe)” option for this question allowed users to define an organization that they felt was not represented on the pre-defined list.

The total number of respondents who provided a free text answer to this question and/or selected “Other” was 87, which is 10% of the total respondents (831). This includes 20 respondents who did not check the “Other” box. 6 respondents selected “Other” but did not enter a description.

The pre-defined categories for this question were:

- American Society for Training and Development (ASTD)
- Consortium for School Networking (CoSN)
- Educause
- eLearning Guild
- International Association for Mobile Learning (IAMLEARN)
- International Society for Performance Improvement (ISPI)
- International Society for Technology in Education (ISTE)
- Joint Information Systems Committee (JISC)
- MASIE Learning Consortium
- Society for Applied Learning Technology (SALT)

Because of the nature of the question, all 87 of the free text responses were unique. The responses below reflect the fact that some respondents listed more than one organization; they are listed separately in this list. Some of the responses were abbreviated for conciseness, and acronyms are defined.

- Association for Educational Communications and Technology (AECT) [12 responses]
- Federal Government Distance Learning Association (FGDLA) [9 responses]
- Not sure [9 responses]
- American Educational Research Association (AERA) [4 responses]
- U.S. Distance Learning Association (USDLA) [4 responses]
- Association for Learning Technology (ALT) [3 responses]
- Institute of Electrical and Electronics Engineers (IEEE) [3 responses]
- National Defense Industrial Association (NDIA) [3 responses]
- United Nations Commission on Science and Technology for Development (CSTD) [3 responses]
- AACE International (formerly Association for the Advancement of Cost Engineering) [2 responses]
- Human Factors & Ergonomics Society (HFES) [2 responses]
- International Association for K-12 Online Learning (iNACOL) [2 responses]
- National Training and Simulation Association (NTSA) [2 responses]
- SLOAN-C (SLOAN Consortium) [2 responses]
- Society for Industrial & Organizational Psychology (SIOP) [2 responses]
- Software and Information Industry Association (SIIA) [2 responses]
- WICHE Cooperative for Educational Technologies (WCET) [2 responses]

The following organizations with a single response are listed below alphabetically:

- ADAPT [not an acronym, this is the official name of the organization]
- ADL Canada
- American Association for History and Computing (AAHC)
- Armed Forces Communications and Electronics Association (AFCEA)
- American Institute of Graphic Arts (AIGA)
- ASCD [there is no expansion of the this acronym, this is now the official name - formerly the Association for Supervision and Curriculum Development]
- ASPCE [couldnt find official name of this organization on Internet]
- Association of Baja California TICS applied to Education
- Association for Computing Machinery (ACM)
- Association for IT in Teacher Education (ITTE)
- Association of the United States Army (AUSA)
- Bersin, Inc. [not a professional organization - this is a commercial entity]
- British Computer Society
- British Institute of Learning and Development
- Canadian Network for Innovation in Education (CNIE)
- Conference Board, Human Capital Institute
- Corporate Executive Board - Learning and Development Leadership Council
- Council on Occupational Education (COE)
- Distance Learning Coordinating Committee (Military Education Coordinating Council) (DLCC)
- European Association of Technology Enhanced Learning (EATEL)
- Faculty of Geo-Information Science and Earth Observation (ITC) of the University of Twente
- Florida Distance Learning Consortium (FDLC)
- Gilfus Advisory Group [this is not a professional organization, it is a commercial entity]
- Health and Science Communications Association (HeSCA)
- HR.com [this is not a professional organization, it is a commercial entity]
- IMS Global Learning
- Indian Society for Learning & Development
- Information Security Forum (ISF)
- Institute of IT Training
- League.org
- Learning and Performance Institute
- LinkedIn [not a professional organization - commercial social networking site]
- Middle East eLearning Association
- Minnesota Educational Computing Consortium (MECC)
- PfP Consortium Advanced Distributed Learning Working Group (ADL WG)
- SimSchools Sharing Messaging
- Society for Human Resource Management (SHRM)
- Society for Technical Communication (STC)
- Società Italiana di E-Learning (SIEL)
- Texas Computer Education Association (TCEA) Technology Coordinators Special Interest Group (TEC-SIG)
- U.S. Army
- University Professional & Continuing Ed

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